ELECTRICAL WEST

June 1955
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U.S.

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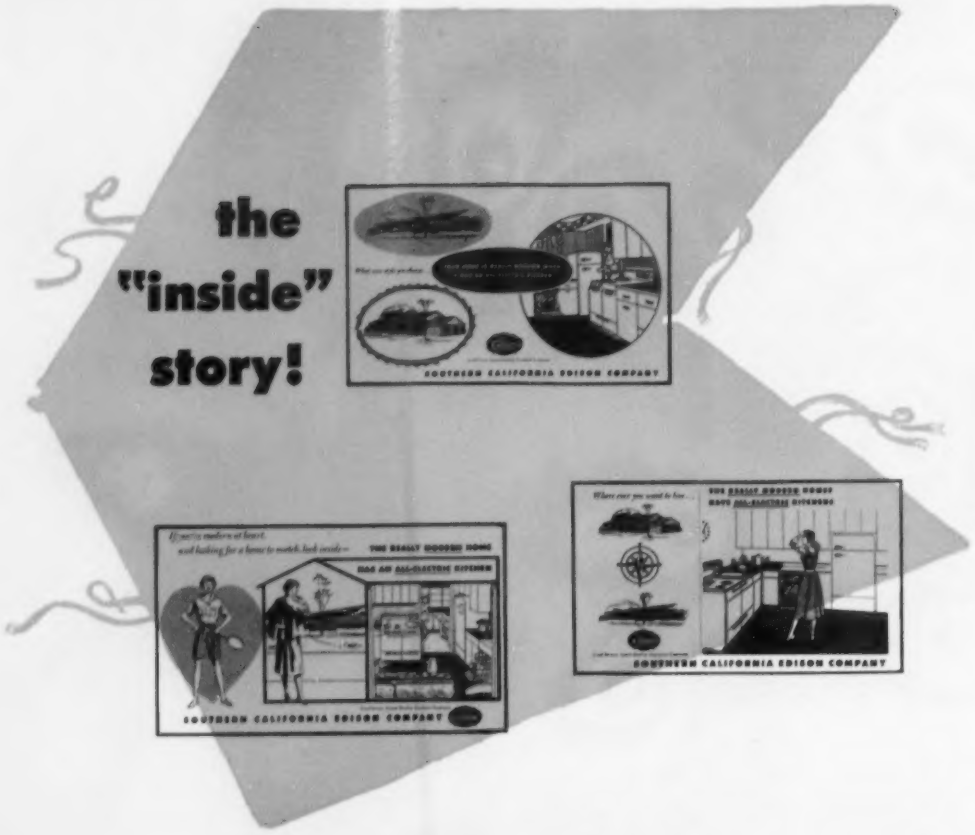


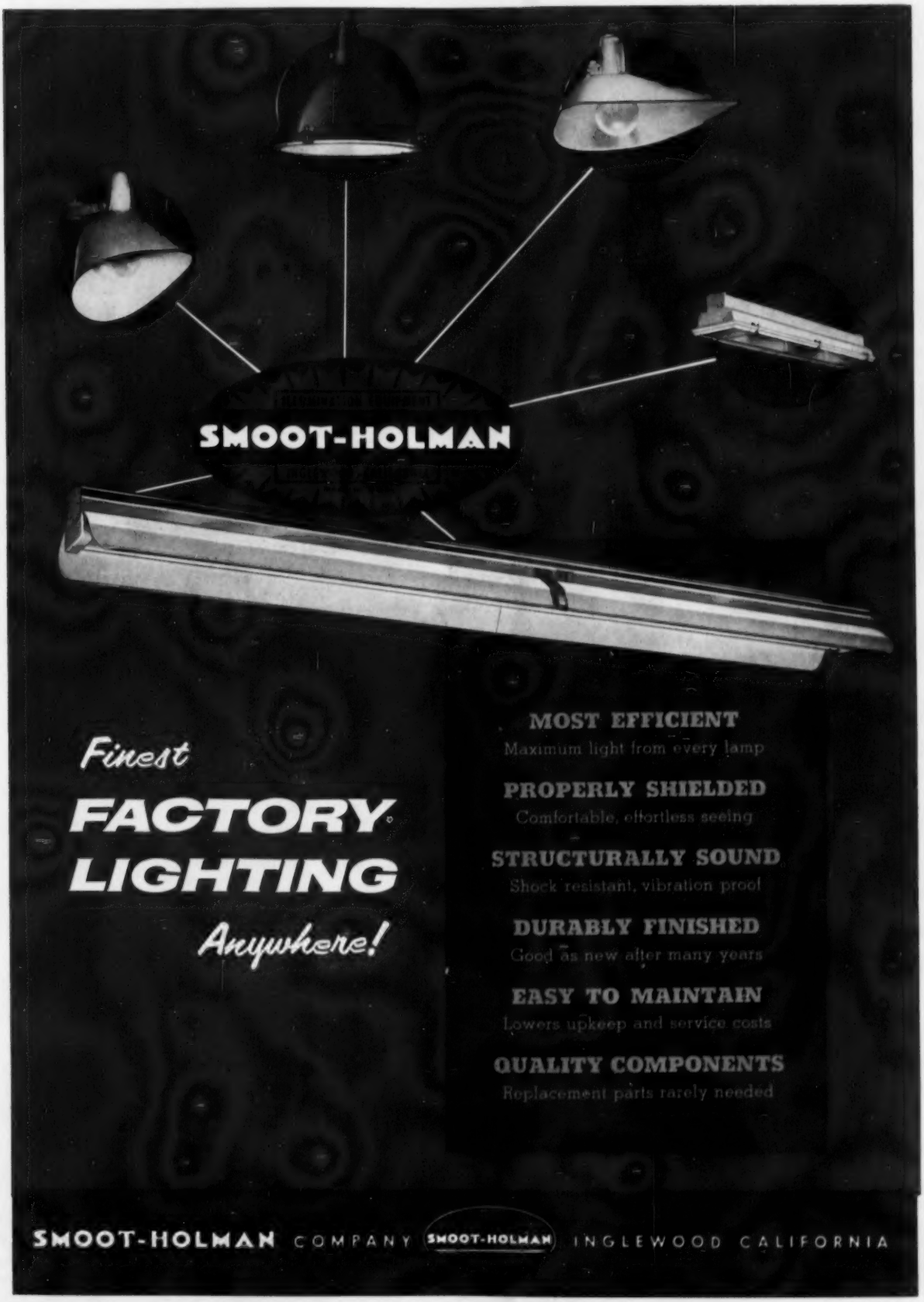
Good Service, Square Dealing, Courteous Treatment

Edison

Underlying this current portfolio of Edison advertisements is the incontestable logic that there is no accounting for tastes in architectural or decorative styles—and no need for such accounting, anyway! The advertisements point out to buyers that you can't tell a *home* by its cover, either; any home can have the really modern touch with an all-electric kitchen.

In new homes or older homes, electric kitchens of course need electrical appliances. So there is something else of real value in this "inside" story: sales for the appliance dealers who make it a point to tie in. In Central and Southern California, Edison tells them and the dealer sells them!

SOUTHERN CALIFORNIA EDISON COMPANY


SMOOT-HOLMAN
Finest
FACTORY
LIGHTING
Anywhere!
MOST EFFICIENT
Maximum light from every lamp
PROPERLY SHIELDED
Comfortable, effortless seeing
STRUCTURALLY SOUND
Shock resistant, vibration proof
DURABLY FINISHED
Good as new after many years
EASY TO MAINTAIN
Lowers upkeep and service costs
QUALITY COMPONENTS
Replacement parts rarely needed
SMOOT-HOLMAN COMPANY SMOOT-HOLMAN INGLEWOOD CALIFORNIA

ELECTRICAL WEST

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

THE ALL-INDUSTRY MAGAZINE OF PROGRESS, ESTABLISHED 1887,
and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity."

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John Cootz, Typography

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Next Month

How a small radio-type vacuum switch is being applied to the power field and the promise it holds forth will be a news beat for July.

Another first is an article on a new four-voice channel power line carrier that opens up a new field in utility communications.

Why and how houses having air conditioning in southern California are being served from two secondaries brings out a new philosophy in serving this type of load.

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Cleveland (15) . . . . . Frank Seiler, 1510 Hanna Bldg., Superior 1-7000
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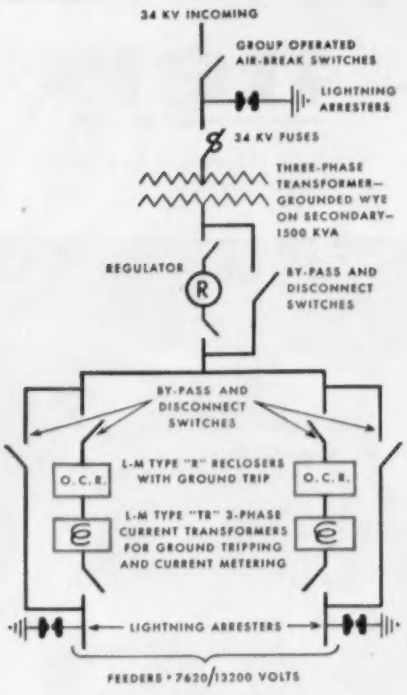
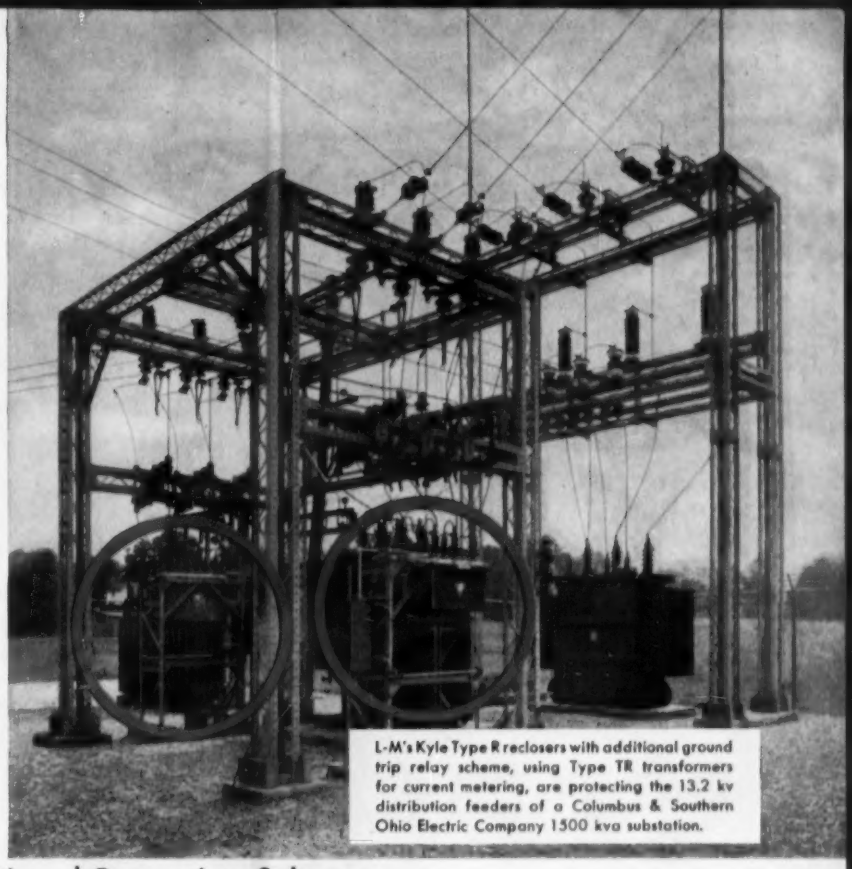


One line diagram of the substation at right. This 34 kv to 13.2 kv substation has a bus regulator and two 100 amp. Kyle Type R heavy-duty reclosers, assuring quality and continuity of service to the customer at all times.



L-M's Kyle Type R reclosers with additional ground trip relay scheme, using Type TR transformers for current metering, are protecting the 13.2 kv distribution feeders of a Columbus & Southern Ohio Electric Company 1500 kva substation.

Take Advantage of Additional Protective Schemes . . .

New Control Devices Now Available with Kyle Type R 3-Phase Reclosers

Methods are given for obtaining auxiliary protective schemes used to supplement the normal series over-current tripping of the recloser.

By **FRANK McSTAY**
Manager
Kyle Products Sales
Line Material Company

Electric service continuity is essential today, as customers depend more and more on electricity for operation. Utility engineers as well as Line Material engineers are aware of the problems involved in designing and operating a protected system economically.

To meet this challenge, L-M engineers have developed a heavy-duty recloser that provides simultaneous tripping of all three phases on feeders with heavy loads and high fault currents. This recloser provides series tripping, reclosing, and dual timing to permit coordination with fuses; and offers facilities to adapt almost any auxiliary relays and indicating equipment to it. Thus it provides the best protective scheme for your system.

Applications for the Type R

The Kyle Type R recloser is a self-contained unit that can be installed on a line pole as well as in a substation. It is a rugged, power-class recloser designed to replace breakers in substations with up to 100,000 kva fault capacity. In addition to segregating permanent faults from the system, the Type R recloser is capable of clearing faults of a transient nature much faster than is normally accomplished with station breakers.

Type R reclosers are also installed on the feeders outside substations that have slow breaker operations, providing for fast (2-cycle, maximum) fault clearing time. This effectively and economically improves operation, provides transient fault protection for the distribution system, relieves the duty on the station breakers, reduces the number of service calls, and greatly enhances service continuity.

Almost any supplementary relaying scheme is adaptable to the Type R recloser operation:

Ground Trip Solenoid is a self-contained ground relay possessing its own dual time-current characteristics.

Shunt Trip Solenoid is a tripping device only, designed to operate the recloser when energized from a supplementary relay scheme.

Shunt Lockout Solenoid is a lockout device only; locks out the recloser instantly. Like the shunt trip solenoid, it is energized by remote control.

Auxiliary Switch provides positions for remote-control indication or low-voltage-control switching of apparatus used in conjunction with the Type R recloser.

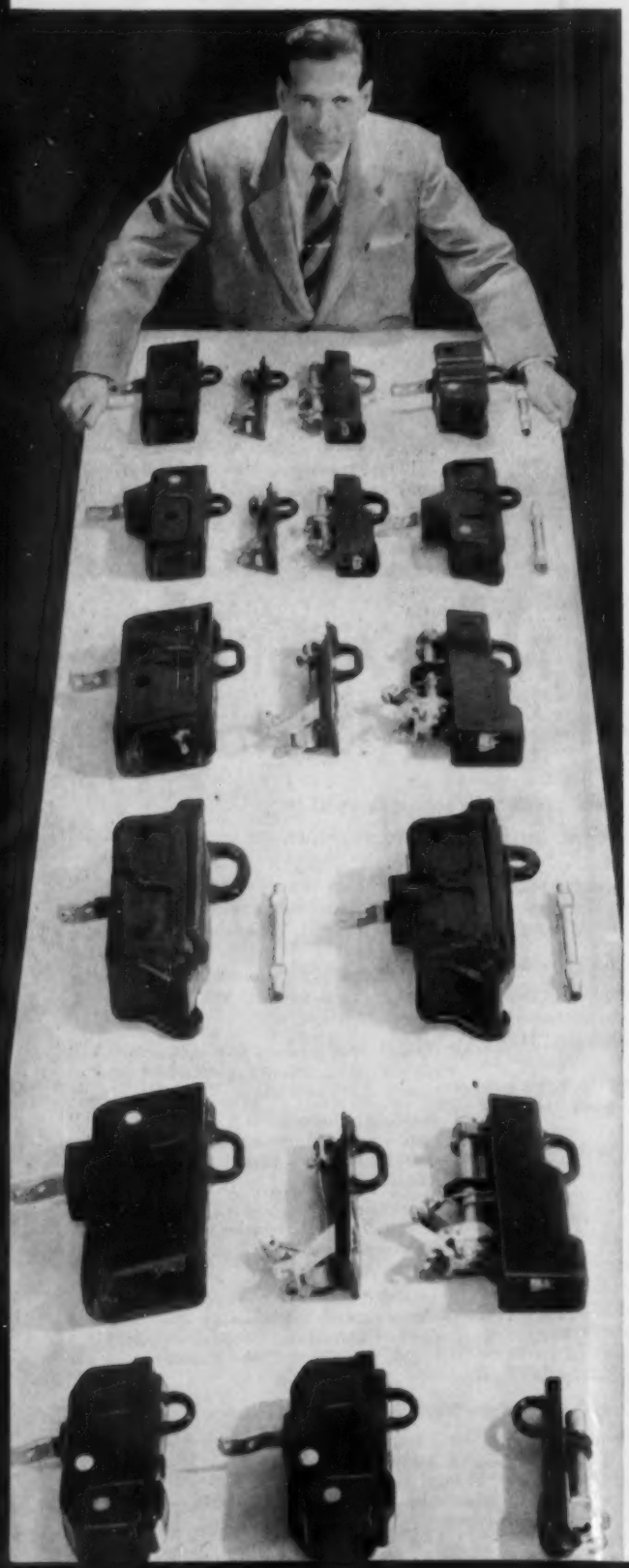
LINE MATERIAL
Kyle® Reclosers

Get the Whole Story on Type R Reclosers

Ask your L-M Field Engineer for complete information on Type R Reclosers and Bulletin CR1C. Or write Mr. McStay, Line Material Co., Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

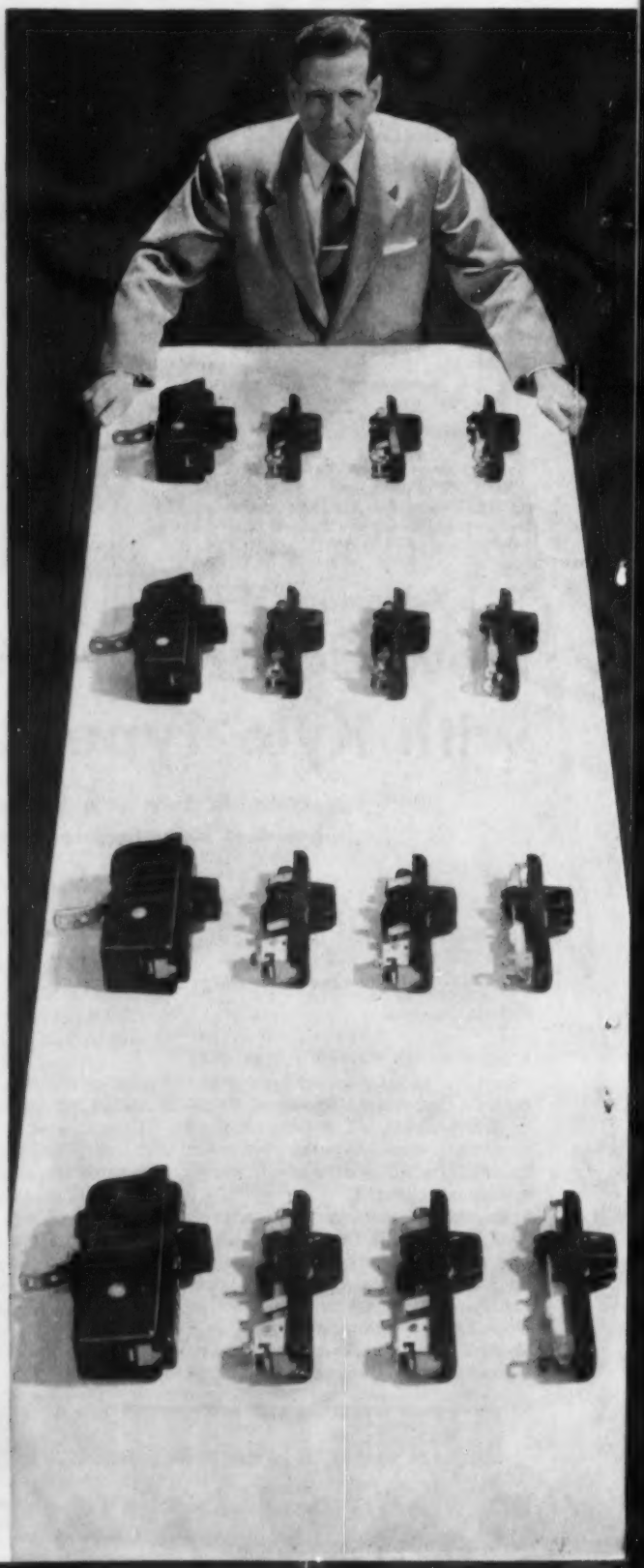
old

Stan Howard, Supervisor, Product Engineering, displays 10 housings and 15 doors of old cutout design.



new

In new design, Stan shows total reduction in housings and doors while interrupting ratings are increased.



ALL-NEW ENCLOSED FUSE CUTOUTS

now...

Stocking is simplified, interrupting ratings increased in new G-E fuse cutout line

Not since 1935, when General Electric first introduced the "family" concept of interchangeable doors, has there been an enclosed fuse cutout development like this!

ALL THE FUNCTIONS—with fewer housings. Before, it took ten housings and fifteen doors to do the job. Now, in G.E.'s all-new line, *four housings and sixteen doors meet every standard cutout need!*

Think of what this means to you and your lineman: There's less chance of error. Stocking is simplified, too. Smaller inventories mean lower handling and storage costs—and lower installation costs. All the lineman has to do is change doors to uprate the cutout.

EVERYTHING YOUR SYSTEM NEEDS. G.E.'s new fuse cutout line gives you all functions—drop-out, non-dropout, indicating, disconnect—in one basic design. You get normal-duty, heavy-duty and/or extra-heavy-duty in all ratings, to match every possible system demand. For a complete description of the new cutout line, write for Bulletin GEA-6208, General Electric Company, Section 433-9, Schenectady 5, N. Y.

LINEMEN AND ENGINEERS AGREE
The completely new line of G-E fuse cutouts has more of the features they prefer. There's good reason, too—the new design incorporates suggestions made by utility engineers and linemen to G-E sales engineers and specialists.

Progress Is Our Most Important Product

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

CARCO Steel Light Poles

Carco Junior steel light poles are fabricated from 11-gauge, hot-rolled carbon steel. Mounting height is 21′ 6″ and upswept bracket length is 4′. Carco Juniors are anchor base type suitable for underground wiring but modifications permit overhead wiring when desired. At Oak Forest, 6.6 ampere incandescent bulbs are being used. Pole spacing is 250′. Started 8 years ago, Oak Forest is now a community of more than 6500 homes. Developer Frank W. Sharp is also installing Carco light poles in Scenic Woods, a new 2000-home subdivision northeast of Houston and in Sharpstown, the nation's largest subdivision, where the first of a total of 25,000 homes are under construction.

$16,000,000 Houston Subdivision Uses 210 Carco Junior Light Poles

Frank W. Sharp, builder of the famous Oak Forest subdivision in northwest Houston, Texas, solved a street lighting problem with Carco Junior (residential type) steel light poles. Sections 15 and 16 of Oak Forest, when completed, will contain 1150 homes and 16 miles of paved streets. To illuminate these streets, 210 Carco poles will be installed.

The reasons Carco Junior poles were specified by Oak Forest are worthy of consideration by others needing street lighting poles. The contractor states Carco poles were bought because they are "sturdy, good looking and economical." Now that over half are up and functioning, the contractor says they are "very satisfactory."

Carco is the first manufacturer to design and fabricate a standard light pole suitable for residential developments, parking lots, service stations, industrial areas, etc. Meeting all the requirements of the I.E.S. street lighting code, Carco Juniors, like all Pacific Car poles, are built to high strength factors to guard against the hazards of traffic accidents, wind and adverse weather conditions. Whatever your light pole needs, wherever you may be, you'll find Carco can supply a better pole and, in all probability, at a saving. Be sure to get a Carco quotation on your specifications. Prices on special poles also given upon request.

Send to our Light Pole Division for copy of catalog on standard Carco Steel Light Poles.

50TH ANNIVERSARY 1905 1955 PACIFIC CAR AND FOUNDRY COMPANY

PACIFIC CAR AND FOUNDRY COMPANY
RENTON, WASHINGTON

STEEL LIGHT POLES, RAILROAD CARS, TRACTOR EQUIPMENT: Winches, Logging Arches, Log Carts, Dozers
STRUCTURAL STEEL FABRICATION AND ERECTION, STEEL CASTINGS, FORGINGS

CARCO®

THE NEW IMPROVED TIREX CORD

Bends and twists without breaking or kinking!

IT'S CURED IN LEAD: the smooth, dense jacket stands abrasion and wear.

Its exclusive SELENIUM NEOPRENE ARMOR makes it tough as a tire!

It is the only portable cord that has passed for 35 years these tests of cord endurance: *Abrasion, Abuse, Heat, Stress* and *Water.*

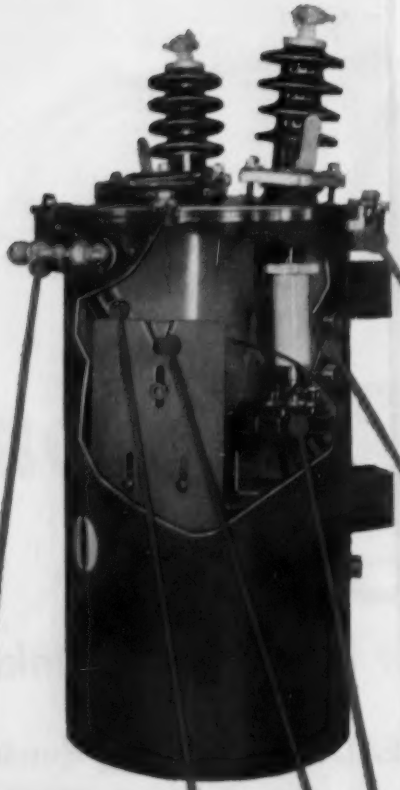
NOW! **After extensive research and development, based on country-wide customer surveys and field tests, *the New TIREX Cord is Better than Ever!***

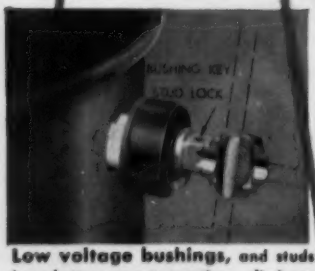
Let us send you Folder 1022 about the new, improved TIREX. Write today to the address below.

Simplex TIREX

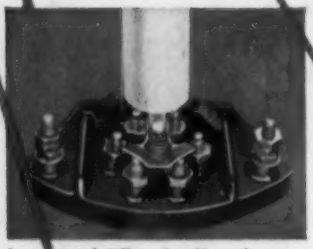
SIMPLEX WIRE & CABLE CO. **79 Sidney Street, Cambridge 39, Massachusetts**

NEW KUHLMAN FEATURES

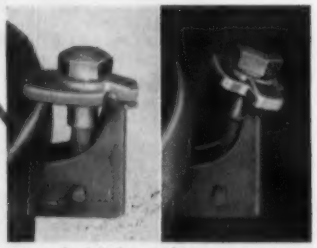




Low voltage bushings, and studs keyed to prevent rotation, eliminate all possibility of internal short circuits. Bushing connectors are designed for three way entrance of low voltage leads . . . from above, below, or front.



Improved "floating" action tap changer maintains positive pressure on both contacts by a spring actuated self-aligning mechanism.



New hold down bars and nuts of forged brass maintain a uniform pressure-seal on transformer tanks . . . are not subject to rust or corrosion . . . do not have to be disassembled to remove cover as illustrated above (right).

Provisions for mounting either valve or expulsion type arresters are made on all Kuhlman transformers built to EEI-NEMA standards through 100 KVA single phase and 150 KVA three phase.

New crimped connections guarantee pullout values equal to 85% of the cable tensile strength and greater than 100% relative conductivity.

New die-formed indented slot in core clamp allows greater lifting hook clearance for ease in handling or removing core and coil assembly.

KUHLMAN

169

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI • SALINAS, CALIFORNIA

DISTRIBUTED BY **MAYDWELL & HARTZELL, INC.** • SEATTLE • SPOKANE • PORTLAND • SAN FRANCISCO • LOS ANGELES • PHOENIX

for the men who make the plant efficient...

EFFICIENCY! Optimum output is only achieved when your plant is running at top efficiency. And here's the show to help you reach your goal. The Western Plant Maintenance & Engineering Show will show you, in operation, the machines, equipment, supplies and services you need for more effective plant operation.

More than 6000 plant maintenance executives attended last year's show. Many more thousands will this year have the opportunity to **examine** and **compare** new equipment; **discover** new methods of maintenance and plant operation; **find** new ways of reducing costs and boosting production.

2ND WESTERN PLANT MAINTENANCE & ENGINEERING SHOW

PAN PACIFIC AUDITORIUM
LOS ANGELES · JULY 12, 13, 14, 1955

Here are just a few of the many products and services you'll see at the 2nd Western Plant Maintenance & Engineering Show

- Building Materials and Services
- Heating, Ventilating Equipment
- Instruments—Meters—Gauges
- Lubricants and Lubricating Equipment
- Maintenance Tools and Supplies
- Management Consultants and Services
- Materials Handling Equipment
- Sanitation Equipment and Supplies
- Electrical Equipment
- Power Generation and Distribution Equipment
- Power Transmission Equipment
- Paints, Painting Equipment, and Product Finishes

The Concurrent 2nd Western Plant Maintenance & Engineering Conference

A vital Conference. Featuring top authorities. Covering plant maintenance methods and equipment for the Western industries. Check coupon for complete details. Mail to:

CLAPP & POLIAK, INC.
759 Monadnock Building San Francisco 5, California

These are three important days **on the job.** They'll pay you real dividends. There is no registration fee. Send the coupon today for Rapid Registration Tickets.

Yes! I want to attend the 2nd Western Plant Maintenance & Engineering Show and Conference.

☐ Please send me_____ Rapid Registration tickets. I understand there is no registration fee for the Show.

☐ Send me complete information and registration cards for the Western Plant Maintenance & Engineering Conference.

Name_____

Title_____

Company_____

Street_____

City_____ Zone____ State_____ M-4

ALL THE FEATURES *plus* ....

MATCHED ENCLOSURES!

SQUARE D's
NEW
DISTRIBUTION
SWITCH BOARDS

DESIGN LEADERSHIP FEATURES

Distinctive Styling provides an attractive, modern appearance matching the control center design.

Easier Installation because removable front and back plates expose generous wiring parts. Isolated horizontal wiring trough has drop-off openings, assuring safer, neater wiring.

Flexibility. Complete sections or branch units can be added or changed to meet specific job requirements.

Easier Inspection and Maintenance. Front, side and back plates are removable, thus providing easy and immediate access to specific areas.

SEPARATELY .... OR AS A TEAM THEY DO THE JOB BETTER!

Write for Bulletin SD-18. Address Square D Company

SQUARE D's **NEW**
PLUG-IN
CONTROL CENTERS

DESIGN LEADERSHIP FEATURES

Increased Safety because bus bars are fully enclosed, rigidly supported and have ample cross section...circuits isolated by individually enclosed plug-in units...disconnect handle designed for maximum operator protection.

Flexibility. Individual plug-in units or complete sections can easily be added, removed or exchanged. Push-buttons, pilot lights, and selector switches can readily be added to unit doors.

Installation Economy. All wiring channels are large and accessible from front without removing units...no "wire fishing."

Space economy, too. Up to six combination starters fit in a 20"x20"x 90" section. Plug-in unit heights are designed in space-saving increments of 3 inches.

Write for Bulletin 244. Address Square D Company, 4335 Valley Blvd., Los Angeles 32, Calif.

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

TOP PHOTO... shows new PENGO duct rodding machine in use by a major public utility in San Francisco Bay Area.

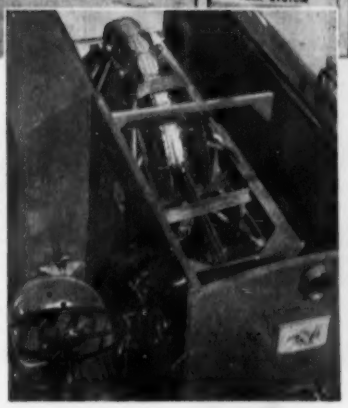


PHOTO AT RIGHT... shows inside mechanism. The large reel revolves clockwise as it pays out or pulls in the steel rod.

Patented

New Duct Rodding Machine

The New Pengo Duct Rodding Machine is capable of rodding ducts to a distance of more than 1000 feet.

An exclusive feature of this ingenious equipment is that it will pay out, hold steady or withdraw the rod without shifting or stopping. It is controlled by the "steering wheel" shown at rear of unit.

Proved in a test operation by a leading utility firm, one machine is claimed to have saved $30,000 over previous methods in one year. In actual use, it successfully rodded over 13,000 feet of ducts in one day.

The reel is designed to hold 1400 feet of #0 oil tempered spring steel wire rod.

The throttle, transmission lever, carriage brake, rod control, footage counter and tachometer are located convenient to the operator.

The body has two tool boxes at running board height and two small tool boxes in the front corners of the body. Top of the mounted unit has two sliding doors that fully expose the mechanism. A window at the operator's left permits him to observe the working mechanism.

A 20 ft. length of spring steel lined wire guide hose together with a support stand is supplied with each unit. Red blinking warning lights are also standard equipment.

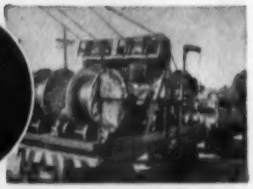
The unit can be adapted to fit on most standard 1½ and 2 ton truck chassis. Outside of the unit can be painted any color. Inside moving parts are painted red. Inside of body is painted aluminum for ease in distinguishing moving parts.

Other PENGO products include:

Heavy Duty Flight Auger

Cutting Head

Tension Wire Stringer

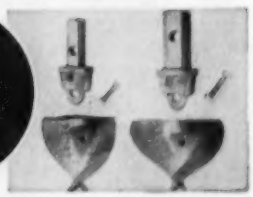


Pulling Eye

Pole and Transformer Chariot

Bucket Auger

Screw Bit for Small Diameter Holes



MAIL THIS COUPON!

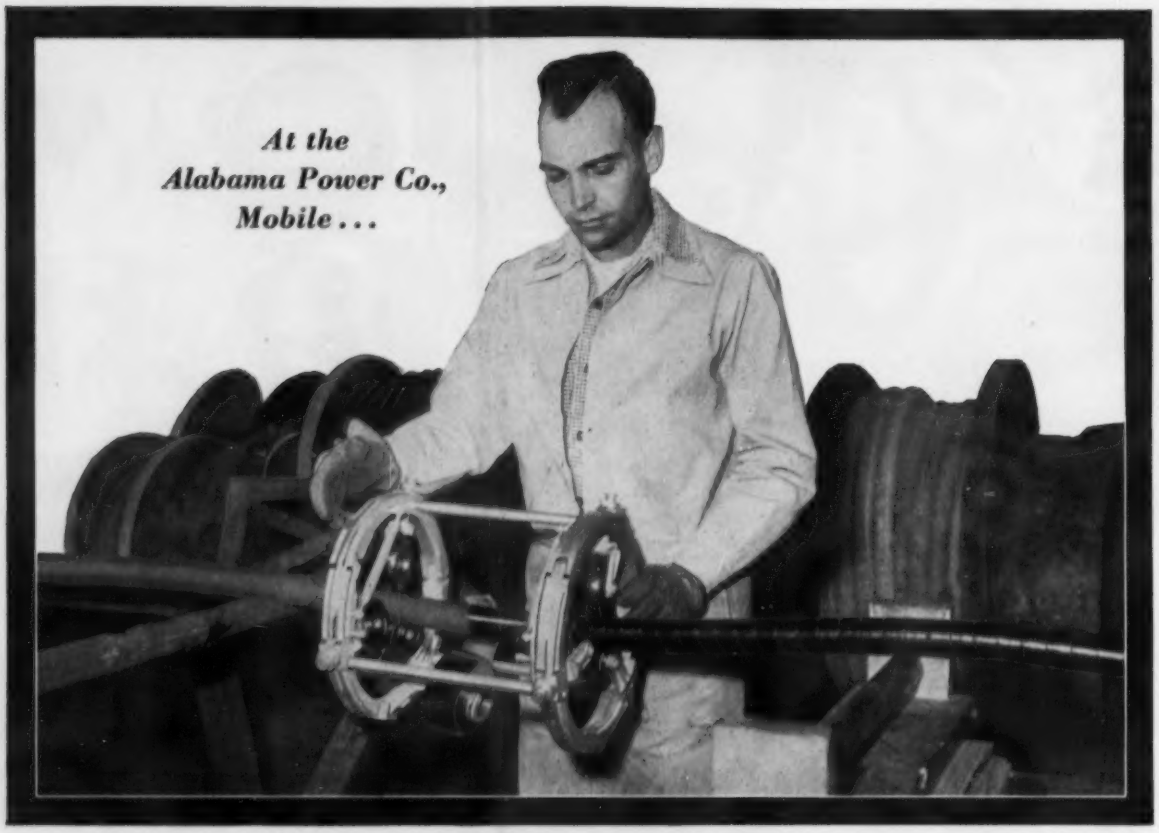
PETERSEN ENGINEERING CO.
Santa Clara, California **Dept. 3**

Please send me more information on your new Pengo Duct Rodding Machine.

Name_____
Firm_____
Address_____
City_____ State_____

Made by the makers of the World-Famous
PENGO EARTH AUGERS

PETERSEN
ENGINEERING COMPANY
Santa Clara, Calif.



REG. U.S. PAT. OFF.

"SCOTCH" Plastic No. 21

BRAND

saved 1000 ft. of costly cable from scrap heap

What do you do with 1000 ft. of buried cable after the outer covering begins to fail? Junk it? Send it back to the factory for re-covering?

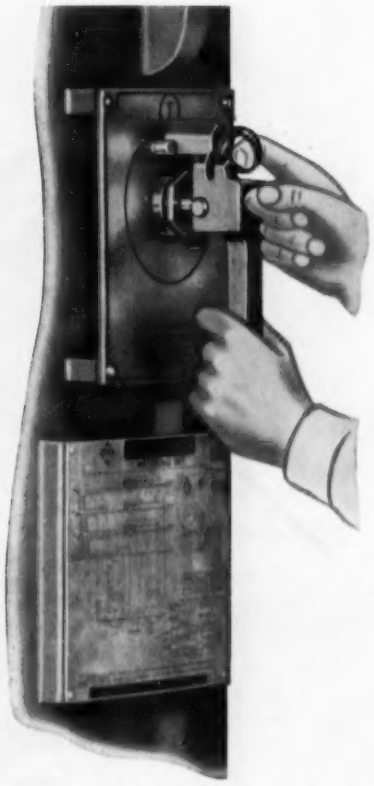
Alabama Power Co., Mobile, Ala., solved that problem quickly, and at low cost with "SCOTCH" Brand Plastic Electrical Tape No. 21.

This tough, corrosion resistant plastic tape was applied to the heavy cable with a pipe wrapping machine at the rate of 5 feet per minute, including changing tape rolls! The operation was rapid, clean, simple. Tests made by pulling the cable repeatedly through conduit gave assurance that "SCOTCH" No. 21 provides a strong, impervious sheath that protects against moisture and abrasion and gives reliable electrical insulation.

"SCOTCH" Plastic No. 21 can be applied by hand or machine. Will not crack. Will not dry out. Resists acids, alkalies, oils, galvanic and electrolytic action. Pressure-sensitive adhesive sticks tight—and *holds*. Write 3M Dept. BU-65 for the complete story.

The term "SCOTCH" and the plaid design are registered trademarks for the more than 300 pressure-sensitive adhesive tapes made in U.S.A. by Minnesota Mining and Mfg. Co., St. Paul 6, Minn. Export Sales Office: 99 Park Avenue, New York 16, N.Y. In Canada: P.O. Box 757 London, Ontario.

No Tools



To change ratio on this metering outfit — just turn the handle

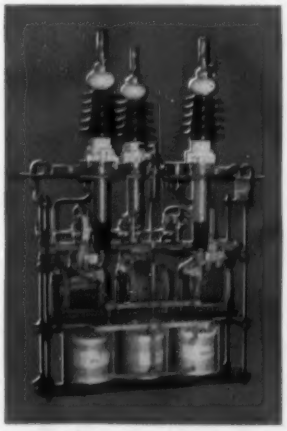
Half a minute instead of half an hour. That's the amount of time you save with Allis-Chalmers metering outfits equipped for *external* ratio changing. Only Allis-Chalmers provides this time-saving convenience.

External ratio changing is safer, too, because it permits floor-level operation. Just de-energize the circuit and rotate the handle. All phases are changed simultaneously.

External ratio changing is a standard feature on all Allis-Chalmers metering outfits for current ratings up through 200/400 amp, 15 kv through 69 kv.

Call your nearby A-C office for complete information. Or write Allis-Chalmers, Milwaukee 1, Wisconsin.

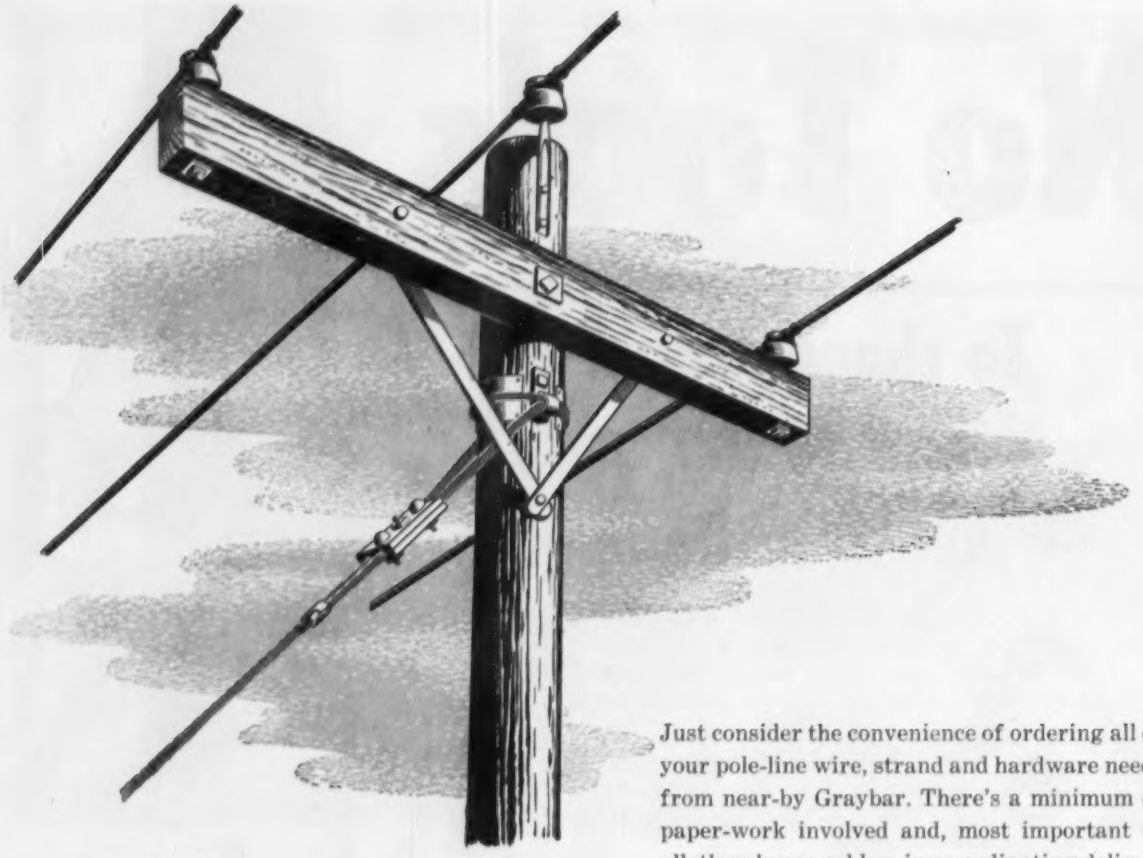
A-4643



Service-proved ratio changer is the same rugged "point contact" mechanism used on Allis-Chalmers power transformers. Contacts are self-aligning. Contact pressure is equal and positive: it is increased as a result of magnetic forces due to current flow. A single current path is established by round point contact under high unit pressure against a flat stationary surface. This strong wiping action cleans surfaces for good contact.

You get high safety factor and sound electrical design in Allis-Chalmers metering outfits. Insulation life is extended because corona is minimized—one more step toward longer service life. All metering outfits are furnished with double current ratings to provide for future load growth.

A-C ALLIS-CHALMERS



Just consider the convenience of ordering all of your pole-line wire, strand and hardware needs from near-by Graybar. There's a minimum of paper-work involved and, most important of all, there's no problem in co-ordinating deliveries from numerous widely-separated suppliers.

Graybar thoroughly understands the needs of the nation's power companies . . . can furnish supplies and materials "from the bottom of the hole to the top of the pole." Graybar Outside Construction Specialists are always ready to help you plan or carry out any project.

Taken all together, you can see why it pays to call Graybar first for everything electrical . . . routine or emergency. *Graybar Electric Company, Inc. Executive Offices: Graybar Building, 420 Lexington Avenue, New York 17, N. Y.*

311-86

LINE WIRE
STRAND
HARDWARE

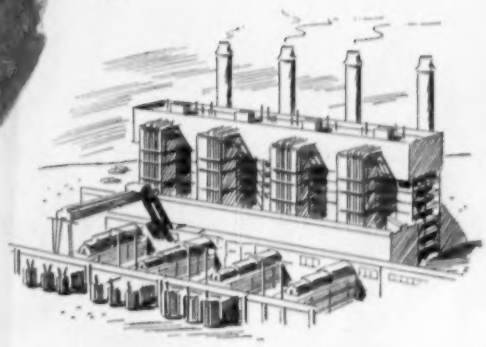
...all via GraybaR

Call Graybar first for...

Everything Electrical
GraybaR ELECTRIC COMPANY

IN OVER 100 PRINCIPAL CITIES

YOUR INDUSTRY is served by a team of Shell Lubrication Specialists, every man an outstanding expert. Call in any member of this team and you benefit by Shell's *quarter-century of documented experience* with lubrication problems in your field!



Shell's men and techniques —with SHELL TURBO OIL—

Stop rust hazard *long after* ordinary oils fail!

Developed entirely by Shell scientists, Shell Turbo Oil cools and cleanses efficiently . . . ends troublesome foaming. And it contains the *most effective rust inhibitor known!*

In one large installation, for example, the original charge of Shell Turbo Oil has been in use since 1940 — shows little change in properties and no sign of equipment deterioration due to rust or sludge!

When Shell Lubrication Specialists prescribe this oil, you also benefit by all of Shell's scientific study and experience with turbines. Shell Turbo Oil — used as Shell recommends — can help you stop rust before it costs you money.

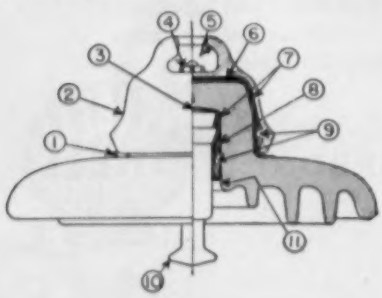
The documented experience of others in your own field is available to your Shell Lubrication Specialist. He can analyze your entire operation from Shell's quarter-century backlog of experience... end expensive guesswork in *all* your lubrication problems. It will pay you to call him today!

SHELL TURBO OIL

SHELL

Triple-Tested...

Stainless steel pin, for use in high-contamination or coastal areas. Available in all suspension insulators on special order.



One of Illinois' outstanding porcelain products is this 10-inch suspension insulator. The cutaway view shows some of the features that assure quality.

1. Ample clearance between edge of cap and top of porcelain shield.

2. High-grade malleable cap, treated to prevent embrittlement when galvanized. Forged steel cap also available. Galvanizing is closely controlled in our own plant.

3. Treated fibrous washer provides a cushion between end of pin and porcelain.

4. Spring brass cotter key.

5. Smooth socket, accurately manufactured to standard dimensions.

6. Resilient compound provides cushion between bottom of cap and top of porcelain.

7. Resilient compound applied on inside of cap and outside of pin.

8. Sanded surfaces (controlled particle size).

9. Cemented joint between hardware and porcelain is neat portland cement.

10. Forged steel pin, accurately gauged to standard dimensions. Also available in stainless steel for use in high-contamination or coastal areas.

11. Radio glaze treatment available if desired, though these insulators meet satisfactory radio noise-level requirements without treatment.

Illinois Electric Porcelain... Triple-Tested To Insure Extra Mechanical And Electrical Strength

1 Complete laboratory control of materials.

2 Extensive new quality-control system.

3 Rigid final testing.

All combine to insure extremely high quality in the finished porcelain insulators.

by **W. V. SWAN**, Vice President
Illinois Electric Porcelain Company

In the two years that Illinois Electric Porcelain has been under Line Material Company operation, we have made extensive changes, from one end of the plant to the other.

A completely new ceramic laboratory has been built, containing the latest equipment for testing raw materials and production methods, and for developing new tests to assure customers that they will get insulators of extremely high quality.

Accurately Controlled Production

The latest precision production machinery has been installed. New, accurately controlled molding, pressing, drying, glazing, and firing equipment assure much more uniform production, and porcelain of greater uniformity in density and strength.

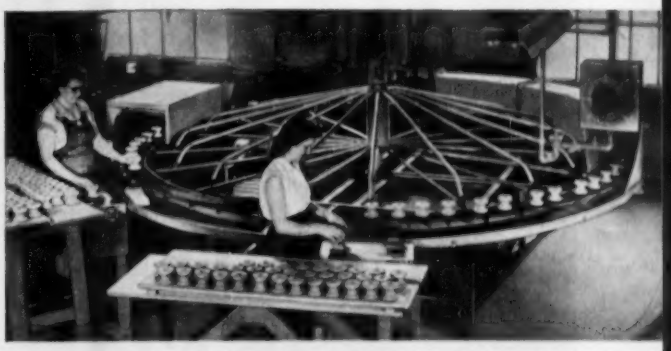
Our facilities include our own completely new, modern galvanizing plant for insulator hardware and fittings. This assures accurate quality control under our own supervision.

Amply Meet EEI-NEMA Standards

The result is that, today, porcelain insulators shipped from this plant are among the highest quality available in the industry. You can buy them with full assurance that you are getting porcelain insulators second to none. They meet EEI-NEMA standards with an ample margin of safety.

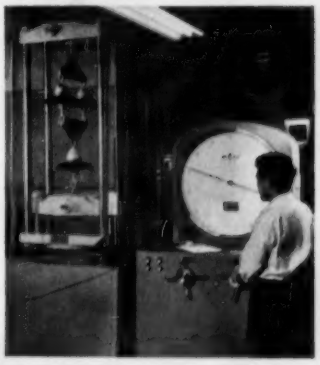
Get Complete Information

Illinois Electric Porcelain Company products include porcelain insulators, hardware, and fittings. These products are sold through Line Material Company. Ask the L-M Field Engineer for complete information, and a copy of the informative Bulletin DL8; or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).



Here's one of the newest developments at Illinois Electric. On this huge wheel, spool and pin type insulators and wireholders are automatically glazed on all sides and partly dried by warm-air circulation, insuring uniform, complete glazing.

Two huge automatic dryers gradually dry the formed porcelain. Heat and humidity are automatically controlled as the ware slowly passes through the dryers. This provides strong, dense ware, free from internal stresses.



Suspension insulators are subjected to simultaneous mechanical and electrical test to destruction—a test performed on a representative quantity of insulators to insure high quality.

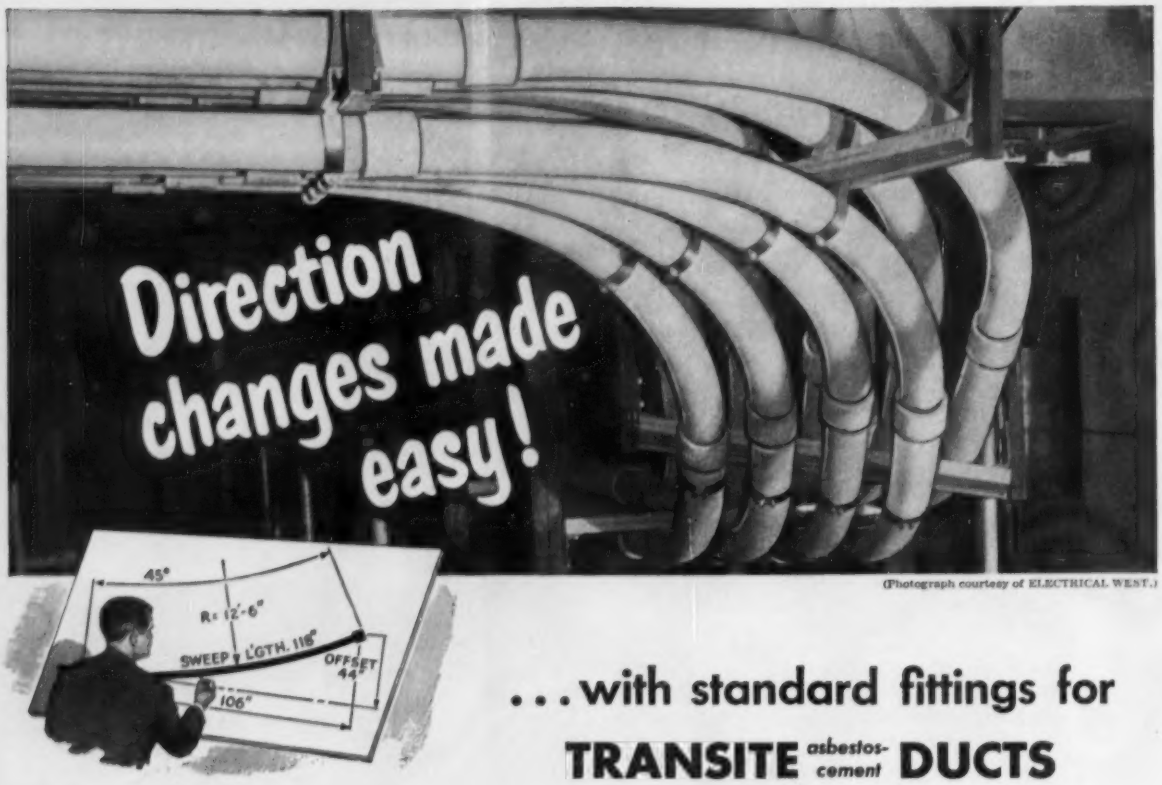
A corner of Illinois' complete new ceramic laboratory. The laboratory contains the latest equipment for analyzing materials and testing production processes.

ILLINOIS ELECTRIC PORCELAIN COMPANY

(a McGraw Electric Company Subsidiary) • Macomb, Illinois

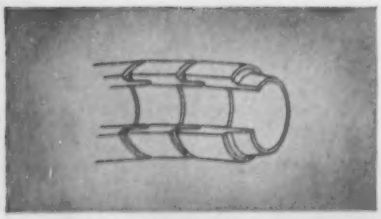
Distributed by **LINE MATERIAL** *Electrical Porcelain Insulators*

(a McGraw Electric Company Division)



(Photograph courtesy of ELECTRICAL WEST.)

. . . with standard fittings for TRANSITE asbestos-cement DUCTS



5° bend segment sketched in detail. It consists of a straight section of Transite stock with a male taper on one end and a female taper on the other . . . each machined at an angle of 2½° to the center axis. Segments can thus be used single, or combined to form bend sections whose curvature is any multiple of 5°.

Photograph showing use of bend segments and curved segments with Transite Ducts.

When you use Transite Ducts, you have available a wide variety of standard fittings, made of the same asbestos-cement material as the ducts themselves. These fittings save time and expense because they provide maximum flexibility in laying out or constructing a duct system. They facilitate clearing unexpected obstructions or accommodating revisions in the original layout.

For instance, the new Transite 5° Bend Segments (shown at left) can be used alone to form simple and complex curvatures of any multiple of 5°. Used with other standard Transite curved fittings, they form curvatures of odd degrees. Thus, they enable you to simplify cross-overs and transformations . . . to clear obstructions . . . to form unusual or special bend or offset sections. They eliminate the need for purchasing special radii bends or sweeps. The other standard Transite fittings that facilitate directional changes are the offset bends, standard 45° and 90° bends, sweeps, curved segments, laterals, tees, elbows and deflection couplings.

For complete information write for new brochure EL-45-A, "Fittings and Dimensions of Transite Ducts." Contains all dimensional data required by the designer. Also available, "Transite Duct Underground Installation Sheet," EL-43-A. Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay St., Toronto, Ontario.

5 OTHER REASONS WHY TRANSITE DUCTS DO A BETTER JOB AT LESS COST:

1. Corrosion-Resistant. Transite, being made of inorganic asbestos and cement, resists corrosion and is immune to electrolysis.

2. Permanently Smooth Bore. Transite makes long cable pulls easy, under any conditions. Danger of damage to cables is also minimized.

3. Incombustible. Transite will not burn or contribute to formation of smoke, gases, fumes. It confines burnouts, will not soften under heat.

4. Higher Thermal Conductivity. Cables run cooler in Transite, reducing I^2R losses, increasing current capacity and prolonging insulation life.

5. Easy to Install. Transite Ducts are light weight, easy to handle. Joints are quickly made. Long 10-foot lengths reduce number of joints in line.

Johns-Manville TRANSITE® DUCTS

JM PRODUCTS

TRANSITE KORDUCT—for installation in concrete

TRANSITE CONDUIT—for exposed work and installation underground without a concrete encasement

New distribution series capacitors

correct low voltage on secondaries fast, economically

Overloaded distribution transformers present the problem of excessive voltage dips and resultant complaints of lamp flicker and poor motor starting. This problem is now being met head on with the exclusive new line of Westinghouse series capacitors. The big fact is that good voltage can be maintained regardless of load power factor. Westinghouse series capacitors permit full use of transformer capacity, and current ratings are coordinated with transformer primary current.

One utility's* experience in 1954, involving extensive use of 240-volt Westinghouse capacitors in series with 2400-volt transformers, proved the capacitor method unquestionably effective. Average voltage benefit for all installations was 5%. Equipment-wise, this arrangement was more economical than any alternative method.

As a bonus, one lineman and one groundman completed as many installations as 6 to 8 line crews could have with other equipment. Average hang-up time —one hour.

Westinghouse has again provided a fast and inexpensive way to fight the overload chain reaction.

For further data, call your Westinghouse Sales Engineer, or write for booklet B-6136 to Westinghouse Electric Corporation, 3 Gateway Center, Pittsburgh 30, Pa.

*Public Service Co. of Oklahoma J-60875

YOU CAN BE SURE...IF IT'S

Westinghouse

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

Helpful technical information-about Apparatus Bushings

If your job involves apparatus bushings—
LOCKE
APPARATUS BUSHINGS
Bulletin No. 1
Guide to Periodic Inspection and Repair of Apparatus Bushings
—you'll want this new 6-page booklet!

PLEASE FILL IN AND MAIL

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General Electric Company
P. O. Box 57, Baltimore 3, Md.

Please send me information as checked below.
☐ Bushing Booklet ☐ Cantilever Strength Estimators
☐ Switch & Bus Insulator Selector

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This is the first of a new series of valuable technical booklets devoted to apparatus bushing maintenance. They will make your job easier by providing you with up-to-date, authoritative information on the subject of apparatus bushings. In developing these booklets, Locke has drawn upon its vast storehouse of bushing know-how. You'll find them of real value in your everyday work. For your copy, please fill in and mail coupon.

---from Locke--
and Switch & Bus Insulators

If your job involves switch and bus insulators—
LOCKE
ENGINEERING
Data
No. 14
Cantilever Strength Estimators
Locke Switch and Bus Insulator Selector
—you'll want these Cantilever Strength Estimators and this new Switch & Bus Insulator Selector!

THE CANTILEVER STRENGTH ESTIMATORS make it easy for you to determine the cantilever load applicable to upright or underhung cap and pin type Switch & Bus insulators, at various distances beyond the free end of their mounting.

THE SWITCH & BUS INSULATOR SELECTOR is a specially designed, easy-to-use circular slide chart. With it, you can quickly determine the mechanical and electrical characteristics of an insulator stack for any given operating voltage or BIL.

For copies, please mail coupon at left.

LOCKE

LOCKE DEPARTMENT
GENERAL ELECTRIC COMPANY
BALTIMORE, MARYLAND

AN IMPORTANT MESSAGE CONCERNING...

A Basic Advance In Motor Insulation

ELECTRIC motor and generator insulation has come in for its share of announcements of "new" and "revolutionary" developments. But in spite of these announcements, inherent shortcomings of conventional insulation have remained.

There has been little basic improvement in motor insulating systems . . . UNTIL NOW.

Allis-Chalmers, working with engineers and scientists of Dow Corning Corporation, has developed *Silco-Flex* motor insulation . . . truly new in concept . . . truly new in effectiveness.

The *Silco-Flex* insulation system employs a pure silicone rubber combined with specially developed application techniques to produce an insulation unmatched by any other in use today. Outstanding improvements are shown in all these important characteristics:

Homogeneity — The complete *Silco-Flex* coil insulation is vulcanized into a single piece with no joints, voids or splices which can develop into breaks in the insulation. Even the best of the new conventional insulations combine several dissimilar materials which are held together by binders.

Heat Resistance — The excellent dielectric and mechanical properties in silicone rubber do not change significantly with aging at high temperatures over long periods of time.

Moisture Resistance — Completely sealed, *Silco-Flex* insulated coils are the most moisture-resistant coils ever produced.

Chemical Inertness — *Silco-Flex* insulation has outstanding resistance to most atmospheric contaminants, corona and weathering. It also withstands weak acids, alkalies and lubricants.

Flexibility and Resilience — *Silco-Flex* insulation remains flexible and resilient indefinitely under operating conditions. It is especially resistant to mechanical abuse and to the stresses brought about by overloading and rapid starting and stopping. It is also amazingly resistant to abrasion.

Heat Dissipation — Most electric insulators, unfortunately, are also heat insulators. *Silco-Flex* insulation, by comparison, is an excellent heat conductor and materially assists in removing heat from the coils.

What Are the Benefits?

The characteristics of this new insulation are so remarkable that complete reappraisal of motor application practices and motor performance is indicated.

In *all* applications, the chemical, mechanical and electrical properties of *Silco-Flex* insulation insure increased service reliability and longer life.

In addition, this new insulation system may reduce or eliminate the need for special motor enclosures. Atmospheres contaminated with cinders and fly ash, for instance, will have little effect on *Silco-Flex* insulated windings. Similarly, abrasive dusts in steel mills will not harm this insulation. Savings through the use of open, instead of totally-enclosed, frames will also be possible in chemical, paper, food and other industries where water or corrosive atmospheres are a problem.

What About Availability?

New *Silco-Flex* insulation is immediately available for all Class H form-wound coils and for Class A and B windings. operating under selected service conditions.

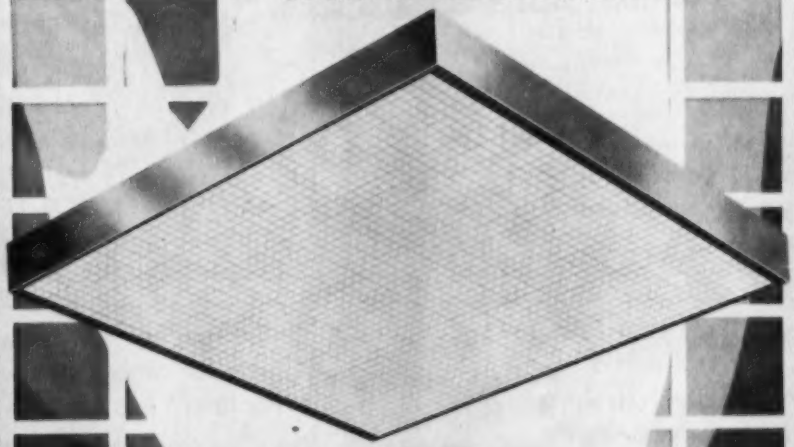
For complete information on SILCO-FLEX ***insulated motors, see your Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.*** A-4664

Silco-Flex is an Allis-Chalmers trademark.

ALLIS-CHALMERS

NEW LIGHTING DIMENSIONS FOR YOUR INTERIORS

4'x4'
QPLM4800-48 *Miniature-celled plastic louver*

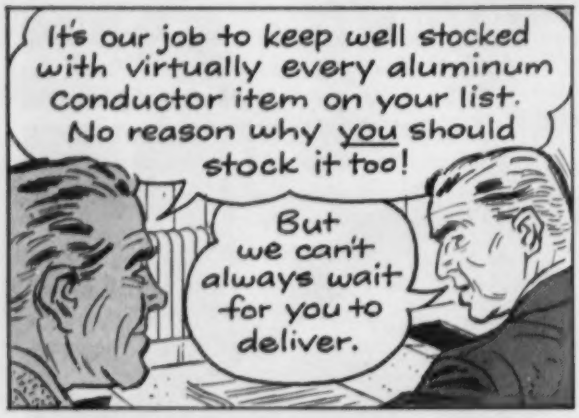


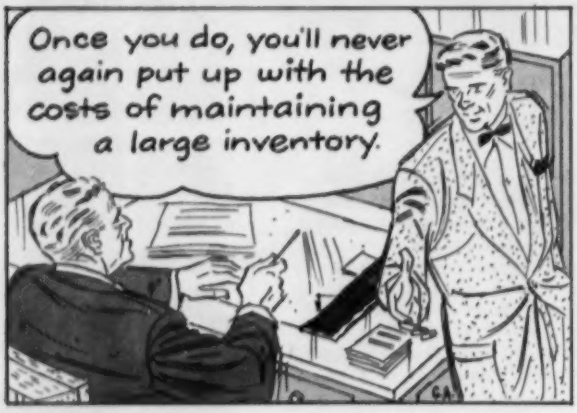
What is more important to architects than "scale"—a sense of proportion and thoughtful consideration for textural and tactual qualities in materials. Sunbeam lighting engineers, appreciating these aesthetic values and adding a few practical factors, have incorporated a new light diffusing medium in many Sunbeam Visionaires®. A miniature-celled, light stable, molded plastic, translucent white louver is available for Sunbeam's 4 by 4, 2 by 4 and 1 by 4 recessed and surface mounted units. Acting as a single, removable panel in each type of fixture, this louver provides excellent diffusion, 45° shielding and high efficiency. A pleasing textural quality is added to the luminous surfaces of these units which blends with contemporary ceiling structures. Sunbeam engineers and representatives will gladly discuss the use of this exciting material in the lighting of your interiors.

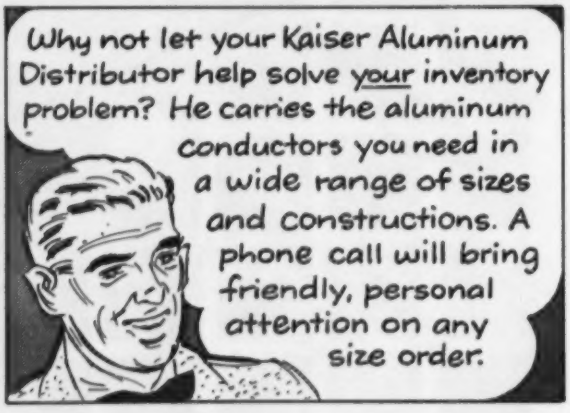
SUNBEAM visionaire LIGHTING COMPANY

SUNBEAM LIGHTING COMPANY
777 East 14th Pl., Los Angeles 21, Calif.

Sure, our inventory is costly!.. But how can a Kaiser Aluminum Distributor change that?
We can help perhaps more than you think. Here's how...


It's our job to keep well stocked with virtually every aluminum conductor item on your list. No reason why you should stock it too!
But we can't always wait for you to deliver.




Why not let your Kaiser Aluminum Distributor help solve your inventory problem? He carries the aluminum conductors you need in a wide range of sizes and constructions. A phone call will bring friendly, personal attention on any size order.

Kaiser Aluminum Distributors Conveniently Located to Serve You:

Line Material Co.
General Electric Supply Co.
Westinghouse Electric Supply Co.
Capital Electric Supply
Central Electric Supply Co., Inc.
Champion, Inc.
City Electric Distributors, Inc.
Corpus Christi Hardware Co., Inc.
Crescent Electric Supply Co.
Dauphin Electrical Supplies
Dutton-Lainson Co.
Electrical & Mechanical Supply Corp.
Eoff Electric Co.
Evans Electrical Supply, Inc.
Florida Electric Supply, Inc.
Hampden Electric Supply Co.
Hunzicker Brothers
Interstate Electric Co. of Shreveport, Inc.
Lighting Fixture and Electric Supply
Mack Electric Supply Co.
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Nelson Electric Supply Co.
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Russell Belden Electric Co.
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George H. Wahn Co.
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Wells Electric Supply Co., Inc.

GET IN TOUCH with your nearest Kaiser Aluminum Distributor *now*. He makes available long experience, specialized knowledge, and valuable engineering services—including the famed field and engineering services of Kaiser Aluminum. For his name, refer to the list at the left and your local telephone directory. Kaiser Aluminum & Chemical Sales, Inc. *General Sales Office*, Palmolive Bldg., Chicago 11, Ill.; *Executive Office*, Kaiser Bldg., Oakland 12, California.

Kaiser Aluminum

The Nation's Largest Supplier of Aluminum Triplex and Weatherproof Conductor

Standard Engineer's Field Report

CASE HISTORY
LUBRICANT RPM 10-30 Special Motor Oil
FIRM Yellow Cab Co., Stockton, Calif.

New oil increases oil mileage up to 45%, gas mileage up to 10% for fleet operator

WITH RPM 10–30 SPECIAL MOTOR OIL in their fleet of 32 taxis, the Yellow Cab Co. of Stockton, Calif., was able to boost oil mileage up to 45%, gasoline mileage up to 10% resulting in substantial savings in each vehicle. Oil ring plugging was practically eliminated. Note in photographs above how ring at left (lubricated with conventional heavy duty SAE 30 grade oil) is almost completely clogged after 30,000 miles of service. Ring on right (using "RPM 10–30 Special") is still free and clear, meaning less oil consumption, increased protection against wear. Clean piston (center) and oil screen (right) show how this new multi-grade oil held deposits to a minimum. A typical unit in the fleet had a daily average of 55% driving, 5% stopped with engine idling, 40% stopped with engine off—and made 25 engine starts.

10-30 SPECIAL RPM MOTOR OIL

TRADEMARK "RPM" REG. U. S. PAT. OFF.

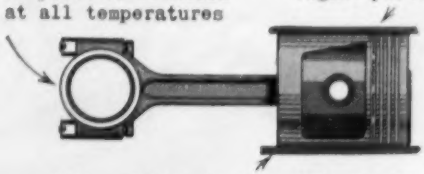
As a result of these savings in oil and gasoline consumption, the company now uses RPM 10–30 Special Motor Oil exclusively in all vehicles.

FOR EXPERT HELP on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative, or write to 225 Bush Street, San Francisco, California.

Why RPM 10-30 Special Motor Oil cuts operating costs

Multi-grade insures complete lubrication at all temperatures

Detergent keeps engine parts clean

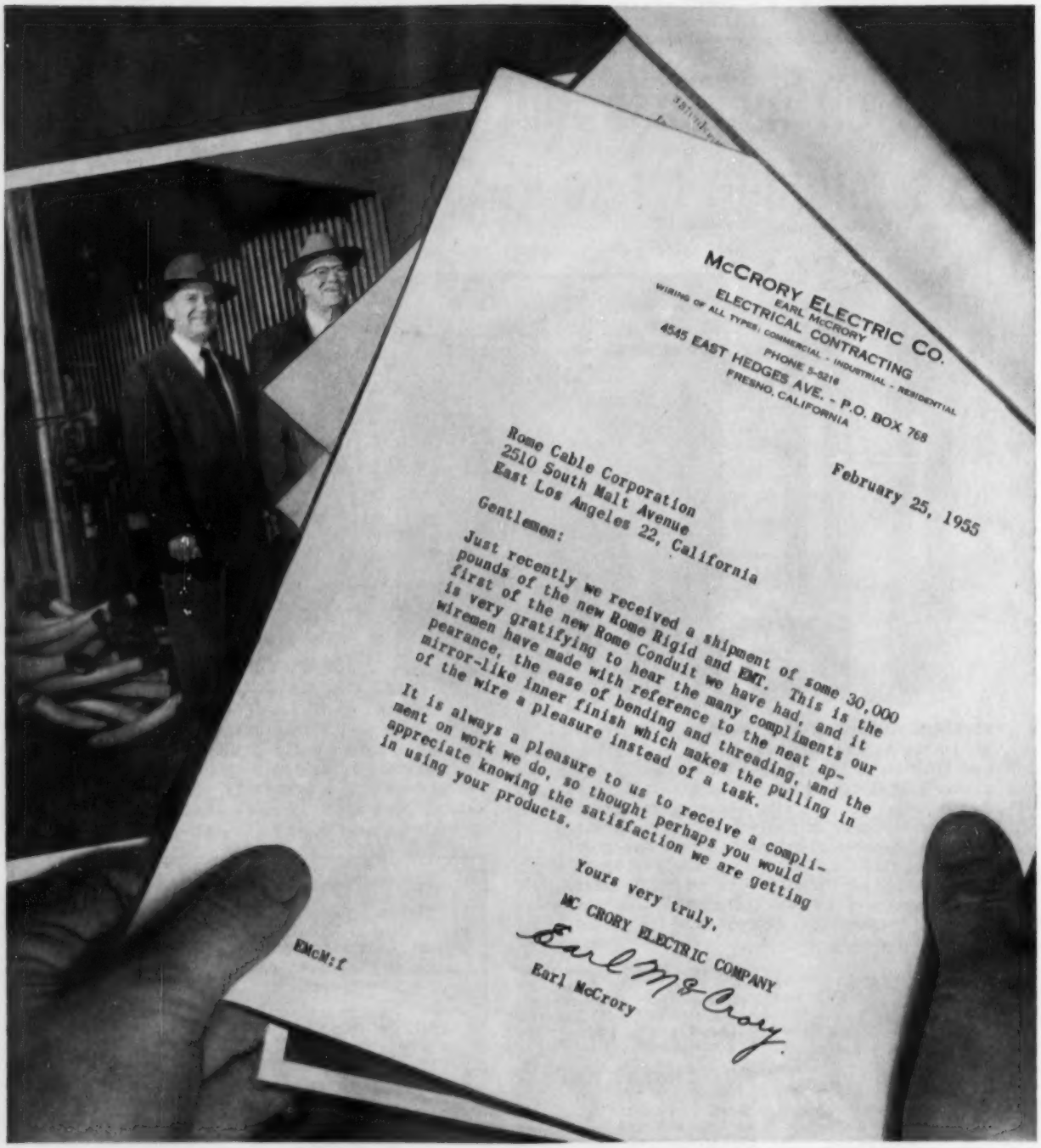


Anti-oxidant resists deterioration of oil and formation of lacquer

STANDARD OIL COMPANY OF CALIFORNIA

If you use electrical

Mr. Earl McCrory, prominent West Coast electrical contractor (right), and Mr. John Harvey, Mgr. Westinghouse Electric Supply Co., Fresno Branch, Fresno, Calif., both expressed real satisfaction with Rome-EMT and Rome-RIGID Conduit because of its uniform quality and ease of fishing.



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WIRING OF ALL TYPES: COMMERCIAL - INDUSTRIAL - RESIDENTIAL
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4545 EAST HEDGES AVE. - P.O. BOX 768
FRESNO, CALIFORNIA

February 25, 1955

Rome Cable Corporation
2510 South Malt Avenue
East Los Angeles 22, California

Gentlemen:

Just recently we received a shipment of some 30,000 pounds of the new Rome Rigid and EMT. This is the first of the new Rome Conduit we have had, and it is very gratifying to hear the many compliments our wiremen have made with reference to the neat appearance, the ease of bending and threading, and the mirror-like inner finish which makes the pulling in of the wire a pleasure instead of a task.

It is always a pleasure to us to receive a compliment on work we do, so thought perhaps you would appreciate knowing the satisfaction we are getting in using your products.

Yours very truly,
MC CRORY ELECTRIC COMPANY
Earl McCrory

EMcM:f

Rome-EMT is stocked for you at these convenient warehouse points:

Atlanta, Ga.	Denver, Colo.	Rome, N. Y.	Seattle, Wash.
Chicago, Ill.	Kansas City, Mo.	Salt Lake City, Utah	St. Paul, Minn.
Dallas, Texas	Los Angeles, Calif.	San Francisco, Calif.	Torrance, Calif.

metallic tubing or rigid conduit

Here are 3 valuable facts you should know

1 You'll find that electrical contractors who use Rome•EMT and Rome•RIGID like it for very practical reasons. The generous and *unsolicited* letter from Mr. Earl McCrory (quoted at left), veteran West Coast electrical contractor, is an example of what Rome *users* think. It indicates what *you* can expect from Rome Cable.

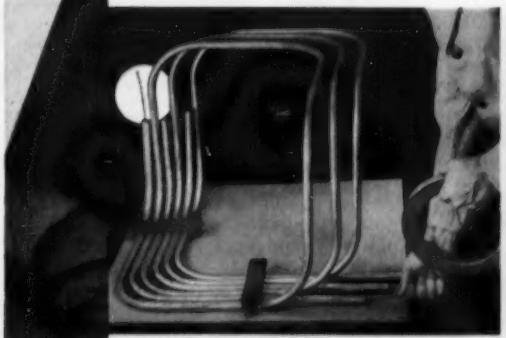
2 Your men will be able to install Rome•EMT faster because the slick new inside finish makes it easy to fish, faster to use than any other conduit on the market. The X-ray pictures on this page are proof of this statement—one more assurance that you'll profit from using Rome thinwall.

3 And, if quick delivery and availability of all standard sizes are important to you, you'll win again because Rome Cable is the *only* Pacific Coast factory source where complete stocks are available, ready for immediate shipment, of Rome•EMT (sizes ½" through 2") and Rome•RIGID (sizes ½" through 6").

Three plus values—user satisfaction, easy fishing for lower installation cost, immediate delivery in all sizes—are yours when you specify Rome•EMT and Rome•RIGID Conduit.

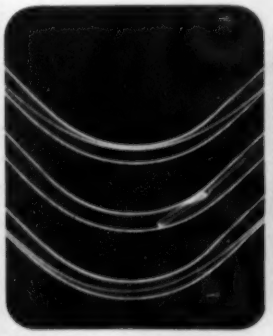
Write today for service or details. Helping you is our job.

This slick, shiny new interior in Rome•EMT lets fish tapes slide through with an absolute minimum of resistance.



Three test runs of conduit, Rome-EMT (closest to you) and two leading competitors were identically formed so that each ten-foot length of ½" EMT has eight 90° bends.

You can see that the ⅛" fish tape was pushed through all eight bends in the Rome-EMT. It took only seconds. But no amount of forcing would get the fish tape through either of the competitive brands.



This X-ray photo shows you how the standard ⅛" fish tape hung fast on the fourth bend in competitor A's EMT.

In this X-ray photo you can see the ⅛" fish tape stopped dead at the seventh bend in competitor B's EMT.

Note:

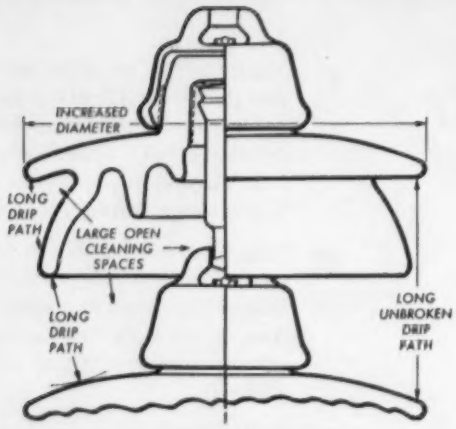
The X-ray photographs were taken by the Anstice Co., Inc., Rochester, N. Y., and witnessed by Chester Uffelman, Notary Public.

It Costs Less to Buy the Best

ROME CABLE Corporation
ROME · NEW YORK
TORRANCE · CALIFORNIA

6 design advantages of Locke's New

Fog-Type MICROGLAZE* Suspension Insulators



1. LONG, PROTECTED LEAKAGE DISTANCE—Half of entire 17" effective leakage distance is on protected under side of insulator where entrapped warmth tends to dissipate fog and moisture. Deep corrugations on under side act as barriers, damping ionization and minimizing streamer formation. This reduces both audible and radio noise.

2. INCREASED IMPACT STRENGTH RATING of 55 inch-lb. results from improved design. High impact and mechanical strength is maintained by careful control of glaze uniformity and thickness which is typical of Microglaze insulators.

3. WIDE SPACING between units makes string assembly and cleaning in service much easier.

4. REDUCED NET WEIGHT lessens installation cost.

5. WIDER SPACING between skirts and between shells of adjacent units breaks up rain drip, reducing tendency to bridge over. This results in fewer flashovers, less radio noise and more reliable line operation.

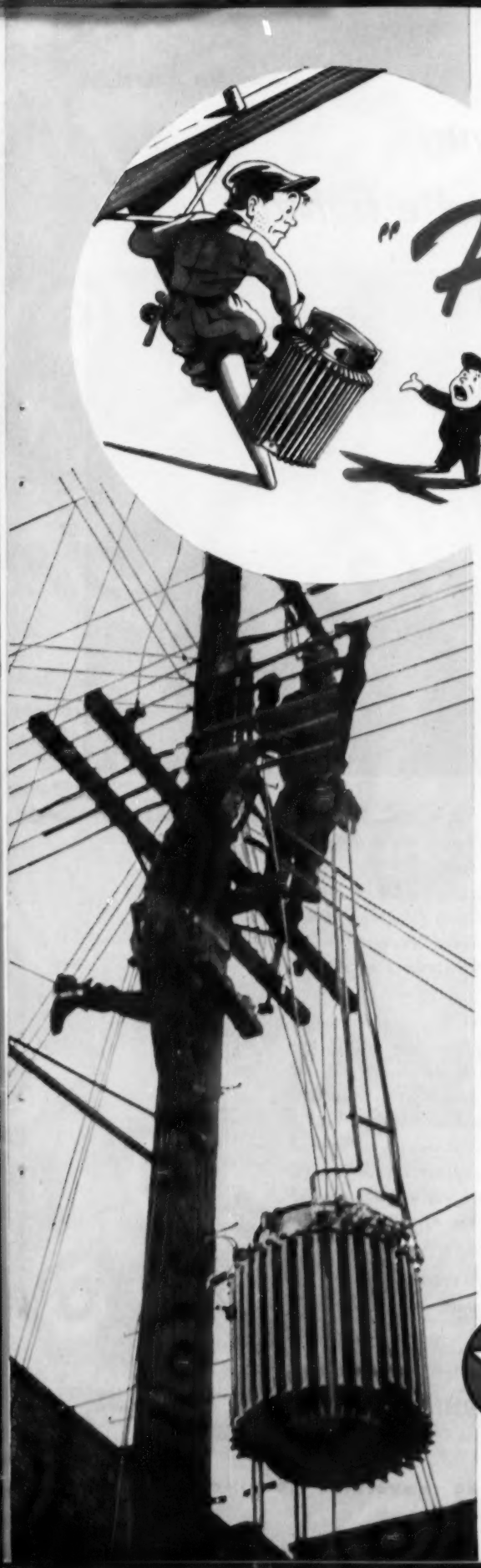
6. RADIO INFLUENCE VOLTAGE is well below standard N.E.M.A. ratings under standard test conditions.

SPECIFY LOCKE'S new Fog-Type for operation in areas where heavy fog, smog, salt spray or industrial contamination demand maximum ratio of *effective* leakage distance to string length.

GENERAL ELECTRIC SUPPLY COMPANY

A DIVISION OF GENERAL ELECTRIC DISTRIBUTING CORPORATION

SAN FRANCISCO · OAKLAND · SACRAMENTO · STOCKTON · FRESNO · LOS ANGELES · SAN BERNARDINO · LONG BEACH
SAN DIEGO · BAKERSFIELD · PHOENIX · TUCSON · SEATTLE · PORTLAND · MEDFORD · TACOMA · SPOKANE



"Hold it, Bob!

that 167 Kva Featherweight **POLE STAR** may be light enough to carry up the pole, but regulations say we must use a block and tackle!"

Maybe Bob's feat would strain the muscles of most linemen. But the fact is, Pennsylvania's Featherweight 167 Kva Pole Stars are *30% lighter than standard 167's.* Equipped with standard EEI-NEMA mounting provisions, they weigh in the neighborhood of 1500 pounds.

This means that utilities with power shortages in congested business areas can provide needed additional capacity *without installing heavier poles, platforms, or expensive underground systems.* The 167 Kva Featherweight Pole Star is designed to replace any single phase 75 or 100 Kva pole-mounted transformer . . . providing 67% to 123% more capacity.

The 167 Kva Featherweight offers the inherently low exciting current found in all Pole Star designs. It features the famous Pole Star wound-lapped core, and is available in standard voltages up through 13,200 volts.

For further information on Pennsylvania's 167 Kva Featherweight Pole Star, write, 'phone or wire your nearest Pennsylvania Sales Representative, or contact

POLE STAR

Distribution Sales Department

Pennsylvania Transformer Company

A McGraw Electric Company Division

pt *Greater Pittsburgh District* . **CANONSBURG, PA.**

"We make money when we install Day-Brite lighting"

John and Henry Bell, Commodore Electric Co., Chicago

"We're in business to make money. It's as simple as that! And—we've learned how to do it.

"Since 1940 we have been serving the Illinois-Michigan area. There's been a lot of building going on here and we've gotten our share. Some real nice jobs, too.

"We're strong for Day-Brite fixtures for several reasons:

"First: They're quality fixtures, through and through. They are trouble free and cost us from 10% to 20% less to install and line up. Not only do we save time on an individual job, but we can more quickly go on to another job and start saving more money. It pays.

"Second: We always deliver a job we're proud of. So are architects, engineers and owners. Naturally, there's no better way to build a sound and profitable business than to deliver a quality job. That means Day-Brite!

"That's our simple story. We've learned that it pays to install Day-Brite Fixtures and we're going to keep on doing it."

SEE!

EXAMINE!

COMPARE!

Attention to details makes Day-Brite "decidedly better." Example: This machine-screw fastener has a conical tip for easy, quick self-centering; a knurled head; undercut shank can't fall out.

5439

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

see your Day-Brite distributor

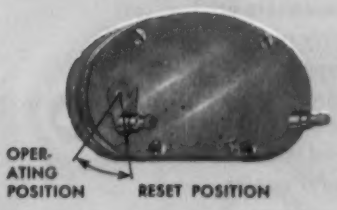
Day-Brite Lighting, Inc., 5412 Bulwer Ave., St. Louis 7, Missouri. In Canada: Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

NATION'S LARGEST MANUFACTURER OF COMMERCIAL AND INDUSTRIAL LIGHTING EQUIPMENT

The Meterman's Meter

NEW DUNCAN SINGLEPHASE METER TYPE MK*

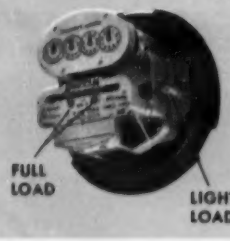
*MK means More KVA



CONVENIENT REGISTER RESET

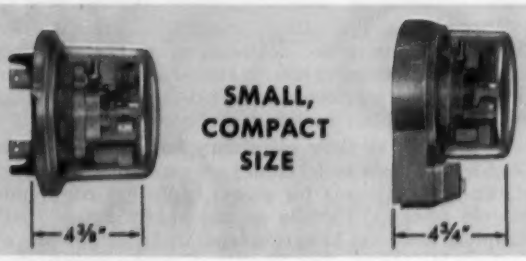
NO BEARING ADJUSTMENTS NECESSARY
—tighten against fixed shoulders

PERMANENT WORM WHEEL MESH



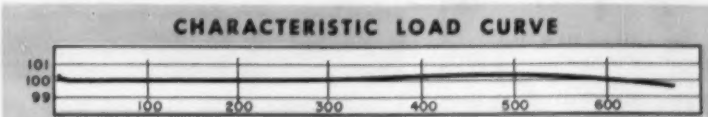
ADJUSTMENTS ACCESSIBLE FROM FRONT

SEPARABLE ELECTROMAGNETS
for ease of maintenance



SMALL, COMPACT SIZE

—and with Full 100-Amp "Extended Range"



Duncan Type MK 15-ampere, 240-volt, 3-wire

Your Dollar Now Buys More Metering Capacity

Pioneers in Extended Range Metering

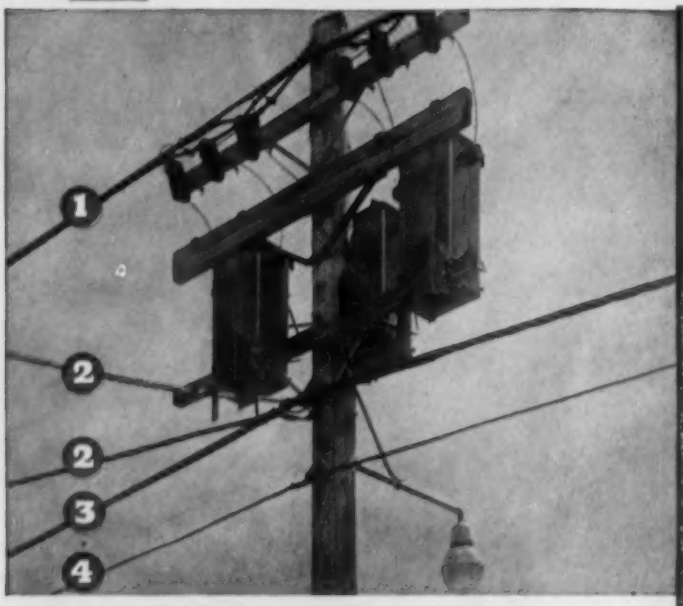
DUNCAN

DUNCAN ELECTRIC MFG. CO.

LAFAYETTE INDIANA

4 applications for OKOLITE-OKOPRENE *aerial cables*

. . . with these 16 advantages



1—PRIMARIES, 2—SERVICES, 3—SECONDARIES, 4—LIGHTING CIRCUITS—all on one pole at Bonneville, Oregon.

- Most utility engineers now recognize the advantages of aerial cables for primary circuits. Moreover, many are now using this economical cable design for street lighting circuits, for secondaries—including networks—as well as for service drops. For such installations, time-proved Okolite-Okoprene aerial cables—whether self-supporting, ring-supported or spinner-lashed—offer many advantages.

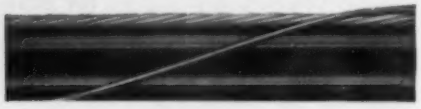
The patented Dualay* assembly, originally designed by Okonite engineers for hot-tapping of Okolite-Okoprene self-supporting primary cables, is also of distinct value for secondary circuits, since services can be taken off at any point, even in mid-span, without racks or spreaders.

In addition to their suitability for utility overhead systems, Okolite-Okoprene aerial cables are extensively used by industrial plants and railroads for power, lighting, communication and control systems. Details on the many types available, with complete data on selection and installation, are available in Bulletin WE 1074. The Okonite Company, Passaic, N. J.

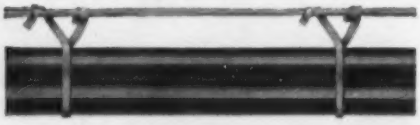
*Hot tap feature: in the Dualay method (U.S. Pat. 2,430,378) the insulated conductors are twisted together so that the direction of lay is reversed at regular short intervals to permit conductor separation without cutting the copper or performing any operation on the messenger.

- **Improved circuit regulation and lower voltage drop through lower reactance.**
- **Tree trimming reduced or eliminated.**
- **Overlength poles not needed to clear treetops.**
- **Fewer service interruptions or outages.**
- **Reasonable original cost.**
- **Lower maintenance cost.**
- **Simple to install.**
- **Higher safety factor for linemen, people and property.**
- **Good appearance.**
- **No festooning.**
- **Long spans.**
- **Less congestion on poles.**
- **Elimination of cross-arms.**
- **Reduced clearance space near buildings and other structures.**
- **Greater reliability in storms—resist wind, icing, moisture—operate even if poles are down.**
- **Messenger serves as neutral.**

Okolite-Okoprene *Self-Supporting* Aerial Cable with in-built messenger. Made with Dualay* design for easy tapping.



Okolite-Okoprene cables can be lashed to messenger by the *spinner method*.



Okolite-Okoprene cables may be installed in regular *messenger rings*.

Available with either copper or aluminum conductors

OKONITE OKONITE SINCE 1878 ***insulated cables***

3229

Iowa Power & Light steps up system capacity by 44,000 kw with G.E.-equipped Council Bluffs plant

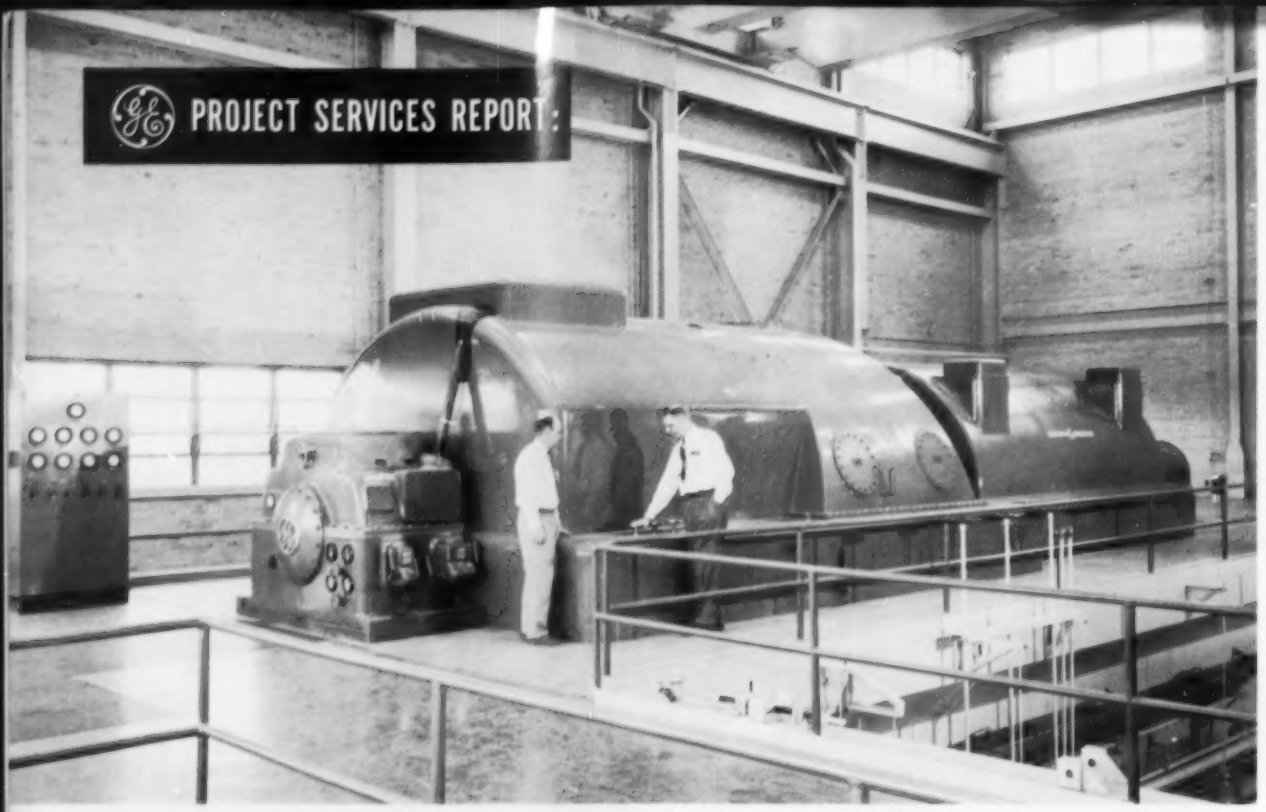
Continued rapid growth of Iowa's industrial and residential load pointed to the need for increased generation facilities in western Iowa. With boldness and foresight, IPALCO climaxed a four-year expansion program with the new Council Bluffs steam station. This 9½-million dollar investment provides an increase in system capacity of 44,000 kw.

Working closely with Black & Veatch, Consulting Engineers, and IPALCO, General Electric assigned a project team to the Council Bluffs station to give valuable assistance in helping to keep construction abreast of schedule and holding total cost within budget restrictions.

GENERAL ELECTRIC

For more station data see next page ►

PROJECT SERVICES REPORT:



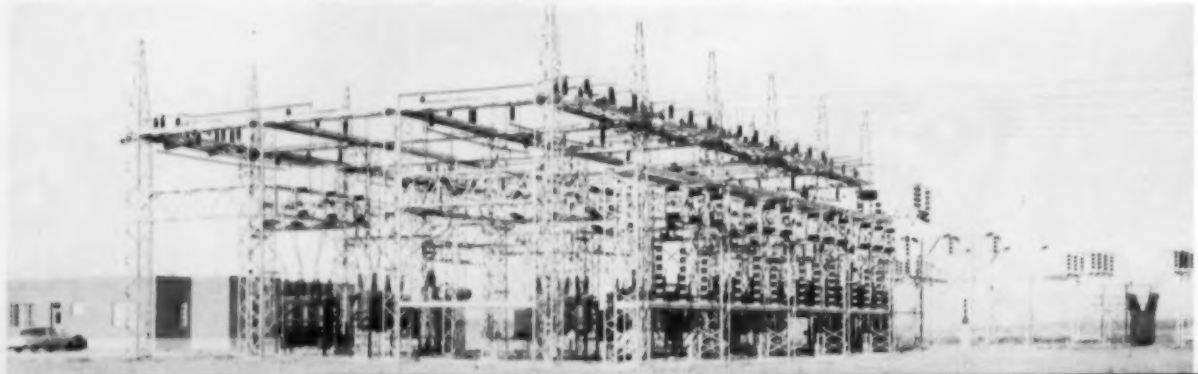
44,000 KW TURBINE-GENERATOR helps IPALCO meet growing power requirements. The General Electric project team met all specifications and coordinated related equipment design details for IPALCO, Black and Veatch engineers.

G. E. helps IPALCO, Black & Veatch cut

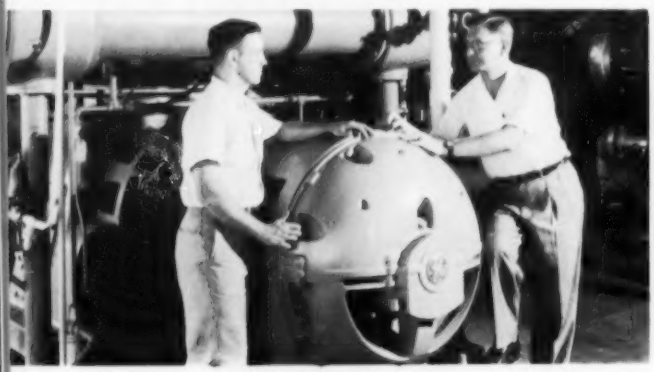
FIRST STEP was conference of F. A. Beaty, IPALCO V. P. (left); R. H. Miller, G. E.; and N. Bernard Gussett, Pres. of IPALCO.

PACKAGED CONTROL BOARD enables operators to secure maximum benefits from station's flexible design.

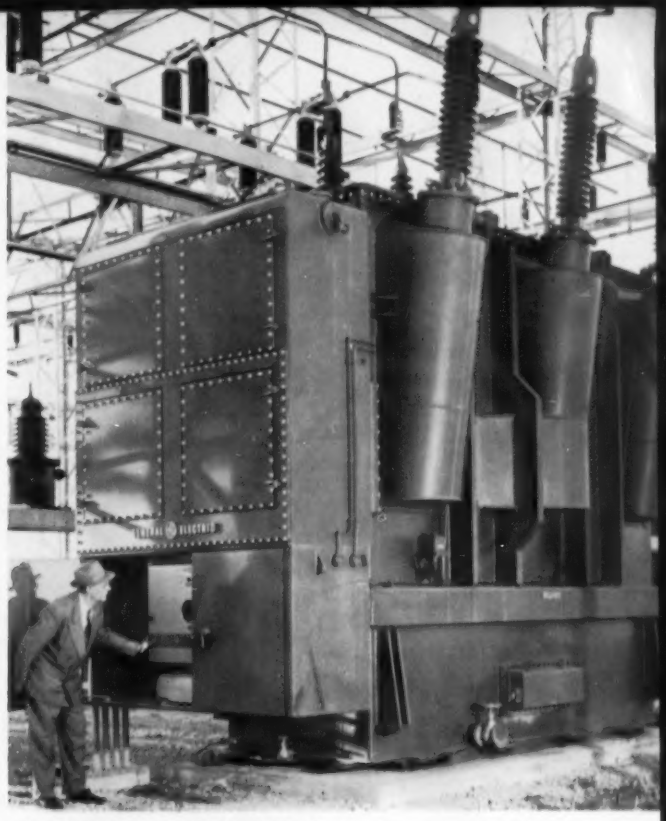
COMPLETE SWITCHYARD including structural steel was supplied as a unit through General Electric Project Services.



PERIODIC REVIEW of station design by (l to r) G. E.'s N. R. Schultz and T. O. Millard; B&V's R. C. Oliver, Jr.; IPALCO's A. J. Adams, helped solve problems, cut engineering time.



SUPERVISED INSTALLATION of equipment such as this compressor motor by G-E engineers helped assure coordination.



ON-SCHEDULE DELIVERY of this 41,667 kva power transformer, being inspected by Clarence Talsma, helped meet start-up date.

engineering time on Council Bluffs unit

Project team links apparatus details to over-all planning, frees utility and consultants for more important duties

When Iowa Power & Light and Black & Veatch selected General Electric apparatus, the G-E team assigned to the Council Bluffs project marshalled the company's vast development and manufacturing facilities. As a result, product engineering time was held to a minimum.

This team, headed by the G-E sales engineer assigned to Iowa Power & Light, was able to coordinate all electrical apparatus detail work, freeing IPALCO and B&V engineers for the project's more important phases. Many factors, such as changes in the design of one item of electrical apparatus requiring modification of other electrical equipment, were coordinated by the G-E project team.

Such teamwork, combining the utility, the consultant, and G-E's team of sales engineer, product specialists, application engineers, order service coordinators, and field service engineers, can save you time, money and man-hours. Here's how it's done:

SIMPLIFY ORDERING OF EQUIPMENT, purchased either directly, or through your consulting engineers, or through a machinery manufacturer.

CONSERVE ENGINEERING TIME by handling electrical details which frees you and your consulting engineers for other urgent problems.

INTEGRATE EQUIPMENT DESIGN to assure the maximum flexibility and effectiveness of plant operation.

SPEED CONSTRUCTION by scheduling the arrival of equipment for maximum installation efficiency.

ASSIST IN INSTALLATION AND IN TRAINING OPERATORS to assure minimum start-up time and better understanding of the full operating capabilities of the equipment.

For details contact your General Electric Apparatus Sales Representative or write Section 302-6, General Electric Company, Schenectady 5, N. Y.

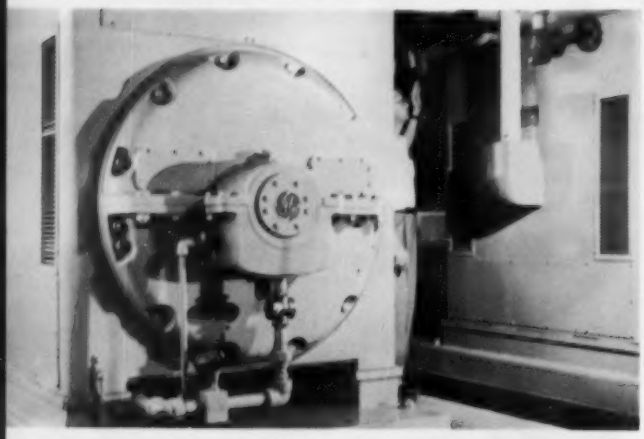
More Power to America

GENERAL ELECTRIC

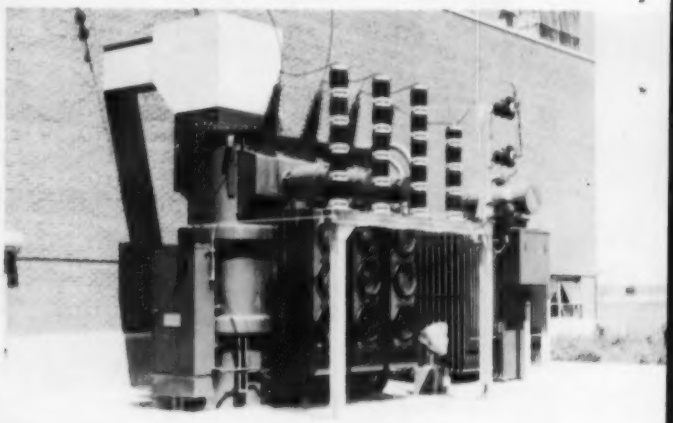
See next page for more data on Project Services ►

PROPER SELECTION of all apparatus from turbines to this G-E ash sluice pump motor is but one of many advantages of G-E project services coordination.

COORDINATED DESIGN of equipment was checked here by E. W. Springer, G. E.; F. W. Motley, B&V; F. L. Sargent, B&V; and J. T. Tengdin, G. E., Kansas City office.



SCHEDULED MANUFACTURE of these G-E boiler feed pump motors, with overhead exhaust, was closely synchronized with Council Bluffs construction progress.



ON-TIME DELIVERY of these G-E 50,000 kva main power and 5,000 kva station power transformers and the lightning arrester protection system helped eliminate costly delays.

How G-E project coordination helps keep plant construction progress abreast of schedule

From the preliminary planning stages in your project, General Electric engineers can help you and your consultants by setting up an apparatus timetable. With start-up commitments in mind, G. E. schedules the design, manufacture, and shipment dates of all electrical apparatus to coincide precisely with the time at which they will be needed at your construction site. This service helps prevent disrupting of construction schedules and sound financial planning because of early or late shipments.

Project coordination is just one of many Project Services on your job when you or your consultant specifies G-E equipment. You take advantage of all these services with G. E.:

APPLICATION ENGINEERING helps assure all electrical equipment is coordinated in design and operation to best suit the requirements of your plant.

PRODUCT DEVELOPMENT ENGINEERING means equipment design which reflects both field experience and laboratory achievements.

FIELD SERVICE ENGINEERING means supervised installation, planned start-up, proper operation of equipment.

SERVICE ENGINEERING helps keep plant operating at full capability, means expert training of operators, setting up of maintenance programs.

PROJECT COORDINATION helps assure proper selection, design, manufacture, delivery of your equipment without costly delays at installation time. 302-6

More Power to America

GENERAL ELECTRIC

GENERAL CABLE

THE GREATEST NAME IN ELECTRICAL WIRE AND CABLE

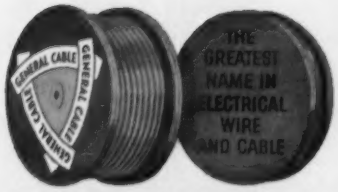
No wonder General Cable consistently produces top quality wires and cables. They have the industry's most modern laboratories and production facilities, over 71 years of experience, and the self-proven knowledge that leadership grows from Quality Products. When you specify General Cable Bare and Weatherproof Wire . . . you're sure of getting the finest!

BARE . . . is available in solid round, square and rectangular, and trolley wire, bunched and concentric stranding, in copper, copper alloys and aluminum, in all tempers, and ACSR — widely used by utility companies for aerial transmission and rural distribution lines.

WEATHERPROOF . . . is available in a large variety of types, including "O.K.," "PEERLESS" and "TIP-TOP." Made with copper, copperweld, bronze, aluminum and ACSR conductors . . . with textile (braided or knitted) unspun cotton and braid, neoprene and polyethylene coverings. Most frequently specified for distribution lines in populated areas.

For complete facts about Bare or Weatherproof . . . or *any* type of electrical wire and cable . . . be sure to see your friendly General Cable Representative first!

GENERAL CABLE
CORPORATION

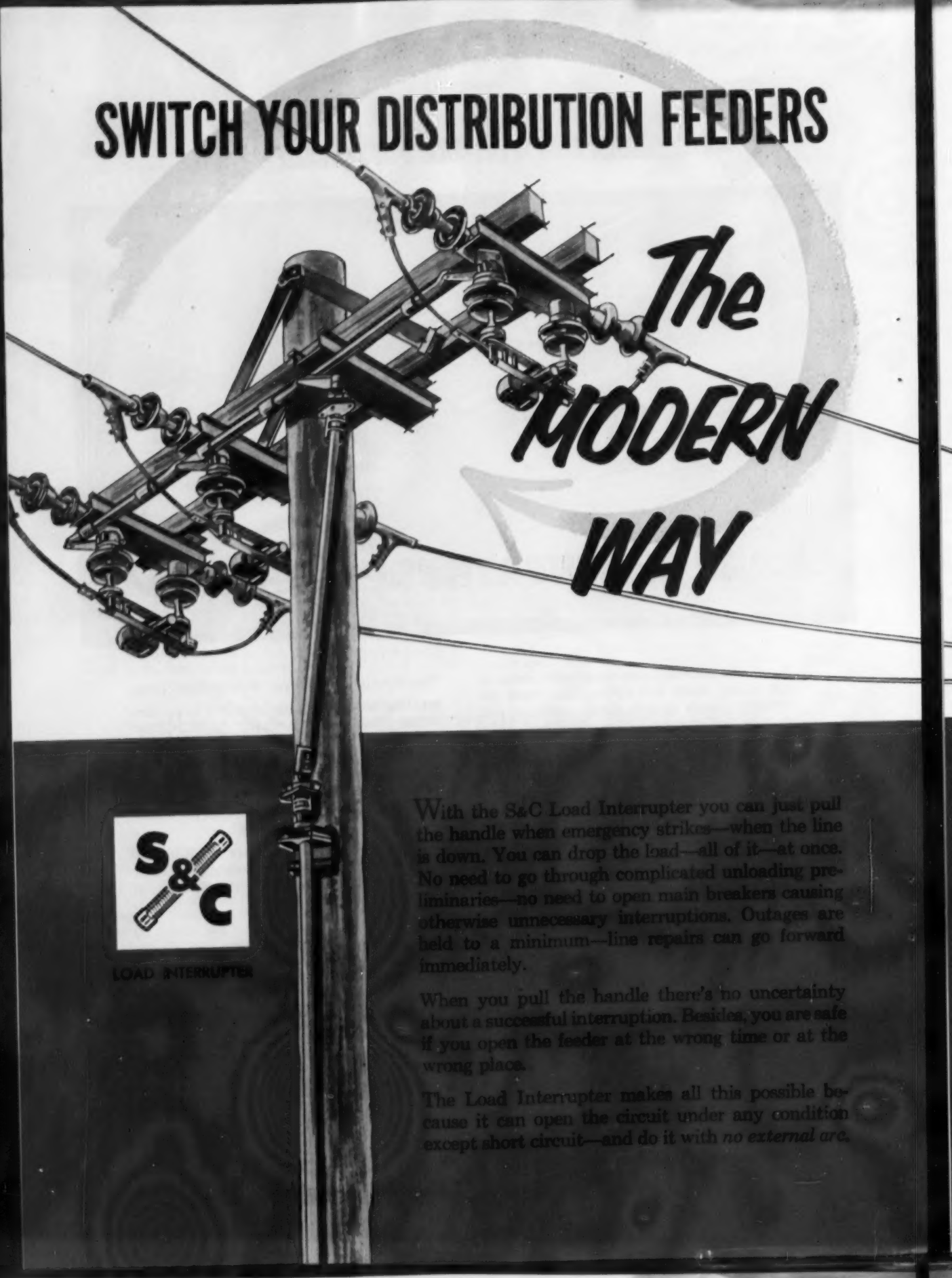


BARE, WEATHERPROOF, INSULATED WIRES and CABLES FOR EVERY ELECTRICAL PURPOSE

GENERAL CABLE CORPORATION
Executive Offices: 420 Lexington Ave., New York 17, N. Y.

SALES OFFICES: Atlanta • Baltimore • Boston • Buffalo Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit Erie (Pa.) • Greensboro (N. C.) • Houston • Indianapolis Kansas City • Lincoln (Neb.) • Los Angeles • Memphis Milwaukee • Minneapolis • New Haven • Newark (N. J.) New York • Philadelphia • Pittsburgh • Portland (Ore.) Richmond (Va.) • Rochester (N. Y.) • Rome (N. Y.) St. Louis • San Francisco • Seattle • Springfield (Ill.) Syracuse • Tampa • Tulsa • Washington, D. C.

SWITCH YOUR DISTRIBUTION FEEDERS



The MODERN WAY

S&C

LOAD INTERRUPTER

With the S&C Load Interrupter you can just pull the handle when emergency strikes—when the line is down. You can drop the load—all of it—at once. No need to go through complicated unloading preliminaries—no need to open main breakers causing otherwise unnecessary interruptions. Outages are held to a minimum—line repairs can go forward immediately.

When you pull the handle there's no uncertainty about a successful interruption. Besides, you are safe if you open the feeder at the wrong time or at the wrong place.

The Load Interrupter makes all this possible because it can open the circuit under any condition except short circuit—and do it with *no external arc.*

AT NEW LOW COST

S&C MAKES LOAD INTERRUPTER ADVANTAGES AVAILABLE UNDER DISTRIBUTION SYSTEM ECONOMICS

LOOK AT THE PRICES

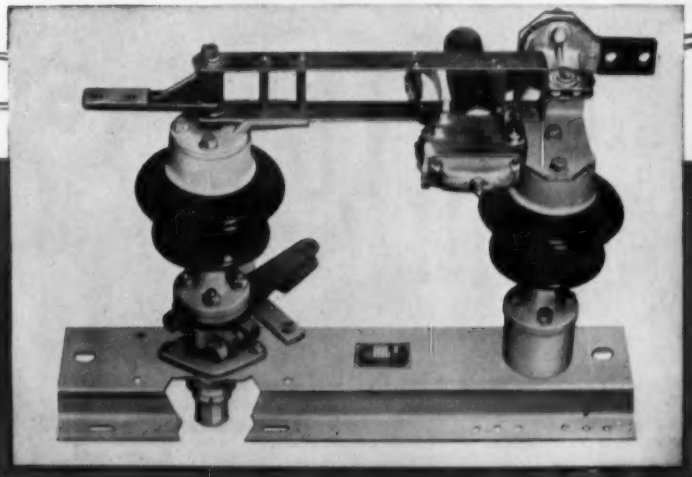
for an S&C 3-pole side-break Load Interrupter—suitable for vertical or inverted as well as upright mounting.

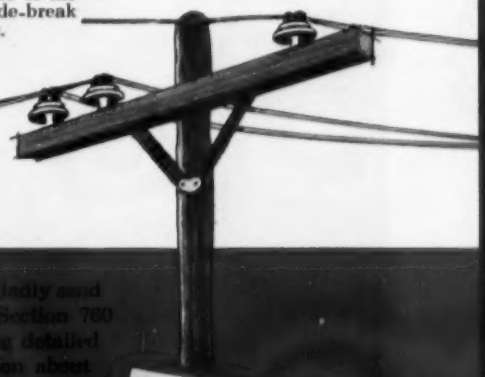
COMPARE THESE PRICES

with what you pay for conventional disconnects or horn gaps. Can you afford to go longer without the advantages of Load Interrupters on your distribution lines?

Kv	Amperes Continuous	Amperes Interrupting	Net Price
7.2	400	400	$455.00
7.2	600	600	480.00
14.4	400	400	465.00
14.4	600	600	495.00

These low prices have been made possible by the "arc-free" performance of the S&C Load Interrupter. Not having to contend with the external arc, side-break action is made possible and hence the two insulator construction.





We will gladly send Catalog Section 760 containing detailed information about S&C Load Interrupters.

Specialists in High-Voltage Circuit Interruption since 1910

S&C ELECTRIC COMPANY

4425 RAVENSWOOD AVENUE • CHICAGO 40, ILLINOIS, U. S. A.

In Canada: S&C Electric Canada, Ltd., 8 Vanzee Road, Toronto 14, Ontario

POWER FUSES • DISTRIBUTION CUTOUTS AND FUSE LINKS • LOAD INTERRUPTERS • METALCLAD SWITCHGEAR

In Atlanta -- Youngstown Buckeye Conduit installed in Georgia State Office Buildings

WHY YOUNGSTOWN BUCKEYE CONDUIT IS BETTER

Youngstown is the one manufacturer who makes rigid steel conduit from ore to finished product. This enables Youngstown to control the complete manufacturing process—your insurance that each length of "Buckeye" is made of top-grade steel.

Mechanical Contractors & Engineers, Inc., Electrical Contractor
Electrical Wholesalers, Inc., Electrical Distributors

Youngstown

BUCKEYE QUALITY YOUNGSTOWN SERVICE **CONDUIT**

●Planned and built for years to come, these modern Georgia State Office Buildings have wiring protected by Youngstown Buckeye rigid steel conduit. It was only natural that Buckeye was specified. Made of top-grade steel, Buckeye dependably guards any electrical system against such damaging elements as water, moisture, vapor, dust and dirt. Its durability makes Buckeye rigid steel conduit ideal for wiring systems that must be permanently **safe.**

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

...EVEN HOT...

"One Piece" FARGO CONNECTORS ARE EASY TO INSTALL

FARGO'S "9000 SERIES" FOR MAXIMUM PERFORMANCE IN SERVICE

Fargo's aluminum-bodied connectors have extra wide contact areas to overcome the high resistance of surface oxides and minimize cold flow. Larger mass gives additional radiating surfaces to hold the connector temperature under that of the conductors even under high fault currents. Well rounded corners and parabolic jaws minimize conductor damage due to physical distortion or nicking.

The soft pure aluminum spacer bar forms around the conductor excluding moisture and is a low resistance path between conductors . . . wide separation of the conductors minimizes the possibility of an electrolyte bridging the gap between the dissimilar metals.

The natural resilience of the connector body plus Fargo's exclusive vibration proof design maintains more than adequate pressure after repeated cycling. Fargo "9000 Series" connectors are available up to 397,500 ACSR.

Ask your Line Material Field Engineer for complete details.

RUBBER GROMMETS HOLD SPACER IN POSITION FOR EASE OF INSTALLATION

For hot work Fargo's "9000 Series" aluminum bodied vise type connectors are available with soft flexible grommets which hold the spacer bar in an open position so the run and tap conductors may be installed with ease. The grommets are out of the current paths between the conductors and do not interfere with the smooth easy operation of the clamp.

It is the easiest spacer bar clamp to install because it is "one piece" . . . no extra parts to assemble or threads to engage. Both hands are free to operate the hot stick.

Tool #72 courtesy of Safety Live Line Tool Company, Oakland, California. Others are available.

FARGO

Manufactured by

FARGO MFG. COMPANY, INC.

Poughkeepsie, N.Y.

Distributed by

LINE MATERIAL COMPANY

(A McGraw Electric Company Division)

Milwaukee, Wisconsin

LM

How to meet utility load growth the easy way

By installing Electro-Mobile Power right at any new point of need, you will—

1. Escape new high-line cost entirely.
2. Postpone—or avoid—expensive additional generating station capacity.
3. Be paying no fixed charges for surplus capacity.
4. Have minimum line loss.

Rail car, truck trailer and portable units—350 to 1,000 kw.

Write for simple formula explaining investment advantages of Electro-Mobile Power to:

ELECTRO-MOTIVE DIVISION

GENERAL MOTORS • LA GRANGE, ILLINOIS

Sold and serviced directly through a manufacturer's organization. Electro-Motive Division offices located in: New York City, Chicago, Jacksonville, St. Louis and San Francisco.

In Canada: GENERAL MOTORS DIESEL, LTD., London, Ontario

Canute, the Dane who in early times was England's king, is best remembered for the time when he sat down near the incoming ocean waves and bade them come no nearer. This the humble king did to prove to his overflattering courtiers that he had no control over the tides . . .

STEMMING THE OCEAN TIDE

As King Canute nobly showed, no man, even in exalted position, can govern the elements . . . our efforts only can be toward resisting them. Kerite Cable, in submarine, underground and above-ground applications, has proved, over the years, singularly successful in resisting the destructive action of the elements —even of time itself. Small wonder the dependability, durability and unique superiority of Kerite Cable insulation have been relied on for years, the world over, wherever formidable cable problems present themselves.

The value and service life of a product can be no greater than the integrity and craftsmanship of its maker.

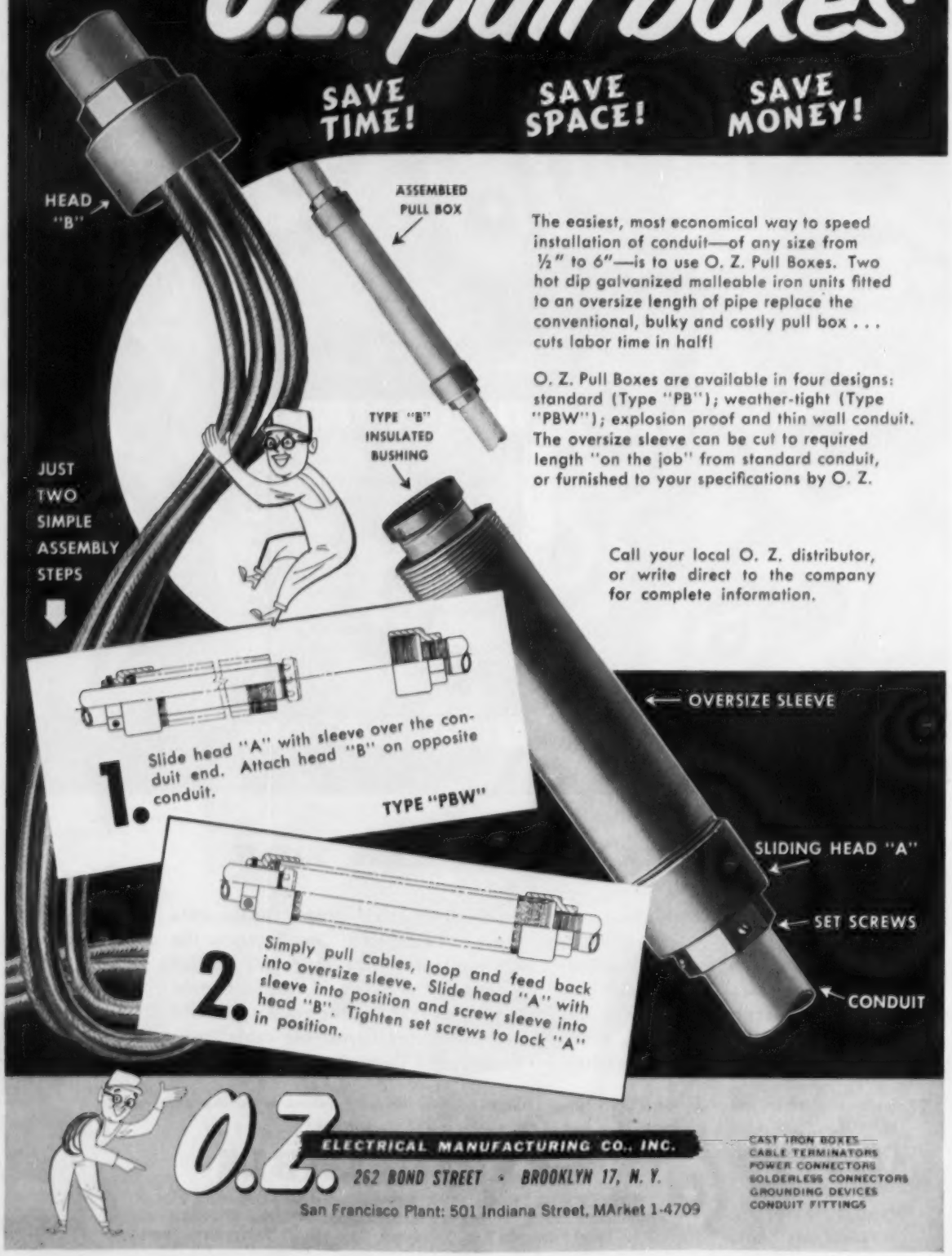
Founded 1854

KERITE CABLE

THE KERITE COMPANY—30 Church St., New York 7, N. Y.
Offices also at 122 S. Michigan Ave., Chicago; 582 Market St., San Francisco;
3901 San Fernando Rd., Glendale 4, Calif.; 31 St. James Ave., Boston

O.Z. pull boxes

SAVE TIME! SAVE SPACE! SAVE MONEY!



The easiest, most economical way to speed installation of conduit—of any size from ½" to 6"—is to use O. Z. Pull Boxes. Two hot dip galvanized malleable iron units fitted to an oversize length of pipe replace the conventional, bulky and costly pull box . . . cuts labor time in half!

O. Z. Pull Boxes are available in four designs: standard (Type "PB"); weather-tight (Type "PBW"); explosion proof and thin wall conduit. The oversize sleeve can be cut to required length "on the job" from standard conduit, or furnished to your specifications by O. Z.

Call your local O. Z. distributor, or write direct to the company for complete information.

1. Slide head "A" with sleeve over the conduit end. Attach head "B" on opposite conduit.

TYPE "PBW"

2. Simply pull cables, loop and feed back into oversize sleeve. Slide head "A" with sleeve into position and screw sleeve into head "B". Tighten set screws to lock "A" in position.

O.Z. ELECTRICAL MANUFACTURING CO., INC.

262 BOND STREET • BROOKLYN 17, N. Y.

San Francisco Plant: 501 Indiana Street, MArket 1-4709

CAST IRON BOXES
CABLE TERMINATORS
POWER CONNECTORS
SOLDERLESS CONNECTORS
GROUNDING DEVICES
CONDUIT FITTINGS

New RLM Specifications for:

1. ALL-WHITE PORCELAIN ENAMEL REFLECTORS (Inside and Outside)
2. INCREASED UPWARD LIGHT
3. MAXIMUM BRIGHTNESS
4. BETTER SHIELDING ANGLES
5. HIGHER REFLECTION FACTORS
6. HIGHER LIGHT OUTPUT
7. CAPTIVE LATCHING and HOLDING DEVICE
8. GROUNDED BALLAST MOUNTING
9. CHANNEL DESIGNED for SLIDING HANGERS
10. REVISED LAMP SPACING
11. IMPROVED LAMPHOLDERS
12. ENTIRE UNIT RUST-PROOFED

NEW RLM SPECIFICATIONS BRING YOU BENEFITS LIKE THESE:

- ✓ Greater Brightness Control
- ✓ More Seeing Comfort
- ✓ Less Lamp Glare
- ✓ More Light for the Money
- ✓ Greater Ease of Maintenance
- ✓ Greater Safety from Electrical Hazards
- ✓ Easier, Less Costly Installation
- ✓ Less "Trapped" Light
- ✓ Easier, Safer Lamp Removal and Replacement
- ✓ Longer Life

Here's what these 12 ADVANCEMENTS in the NEW RLM SPECIFICATIONS mean to you in terms of BETTER INDUSTRIAL LIGHTING

The better lighting advantages listed above, highlight the many benefits that are yours as a result of the newly-established 1955 RLM Specifications for incandescent and fluorescent lighting units. With the ever-increasing importance of the right quality and quantity of light for greater efficiency in today's highly competitive industrial production, the selection of the proper lighting equipment becomes more important than ever. That is why these new 1955 RLM Specifications are more valuable than any set of industrial lighting specifications published during the RLM Standards 35-year history. That is the reason, too, why you benefit in more ways than ever before when you specify lighting units certified to carry the RLM Label. Today's RLM-labeled incandescent and fluorescent lighting equipment is made to the latest approved standards of illuminating engineering, to assure you of getting more light for your money now and for years to come. The newly-added specifications reflect American Industry's changing requirements for better light. That means not only higher footcandle levels, but also greater eye comfort . . . through greater brightness control. These, and many other advanced illuminating engineering principles are behind every RLM Label on every RLM-certified lighting unit. For a complete set of the new RLM Specifications, as well as other up-to-date lighting data, send for your free copy of the RLM Specifications Book.

Address your request to RLM Standards Institute, 326 West Madison Street, Suite 815, Chicago 6, Illinois.

RLM STANDARDS INSTITUTE
INCORPORATED

R1006

How Union Electric met the cry for MORE KVA...ECONOMICALLY

Faced with today's universal problem of growing secondary loads, Union Electric Co. of Missouri found a swift economical answer in the new General Electric standard 167-kva transformers.

In one area near Festus, Missouri, Union Electric needed to increase kva capacity and at the same time change distribution voltage from 2400/4160 wye to 7200/12470 wye. It was desirable, however, to use existing poles and to maintain existing clearances. Lightweight, low-height units were obviously required.

The company did the job quickly and economically by installing the new G-E standard 167-kva transformers. The average time for mounting from ground to crossarm was less than five minutes. No special riggings were necessary and no platforms had to be built.

The new 167-kva transformer is another result of G-E research in a continuous program to reduce transformer weight and height. Today the 167-kva unit is ***670 pounds lighter and 14" lower than before.*** It is now in the pole-type class and is available as a standard unit.

Thanks to G-E engineering developments you can now hang distribution transformers of higher kva ratings without replacing poles and without building costly platforms. Let G.E. help solve your load growth problems. Simply call your nearest G-E Apparatus Sales Office. General Electric Co., Schenectady 5, New York. 431-34

Progress Is Our Most Important Product

GENERAL ELECTRIC

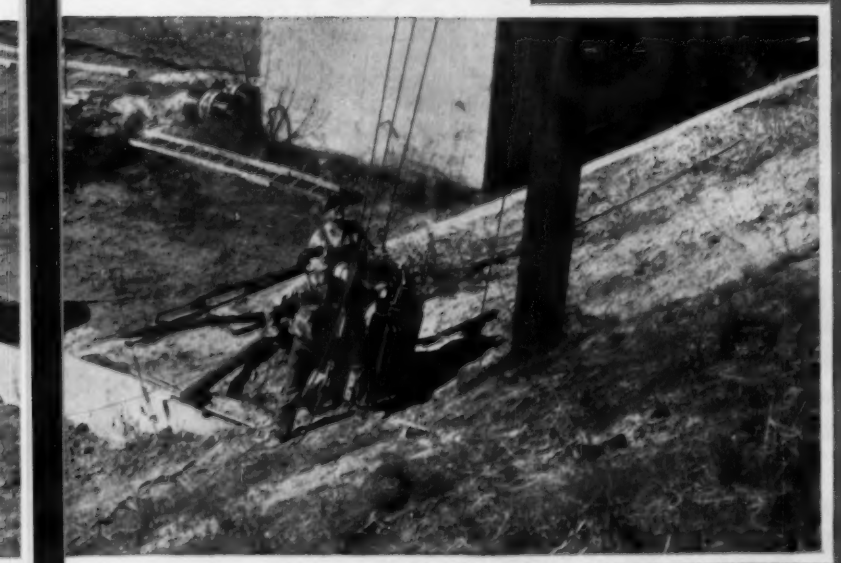
With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

OLD 167-KVA UNIT VS. NEW STANDARD 167-KVA UNIT

OLD		NEW
2170 lbs.	Weight	1500 lbs.
67 1/4"	Height	54"
740 Watts	Core Loss	550 Watts
1.25% at 1.0 p-f	Regulation	1.25% at 1.0 p-f
3.5% at 0.8 p-f		2.9% at 0.8 p-f

NEW

G-E standard 167-kva unit goes from ground to crossarm in 5 minutes

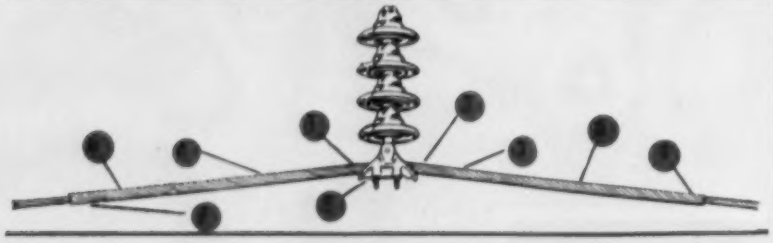


in fine **FANNER**

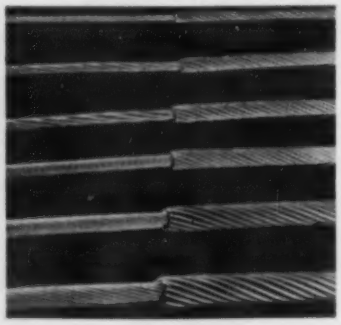
Superformed **ARMOR RODS**

Their *VERSATILITY* means ECONOMY plus these *ADVANTAGES* (and more):

1. **Conductor protection against harmful effects of vibration.**
2. **Ends chafing and pitting of conductor by loose line components.**
3. **Elimination of damage to conductor in case of power arcs.**
4. **Conductor strength and conductance restored where damaged.**
5. **Benefits from smaller and closer fitting clamps.**
6. **Complete reusability — time after time.**
7. **Permanent "self-clamping" action for life of the application.**
8. **Facilitated hot-stick application when necessary.**
9. **Conductance of armor comparable to that of conductor.**



• High standards in design and production of FANNER SUPERFORMED ARMOR RODS based on over 50 years of manufacturing provide unvarying uniformity of application and service. Consult our agents or write direct for additional information on Superformed Armor Rods, Line Guards, Tap Armor and Patch Rods.



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Fink Fanner Superformed

THE FANNER MANUFACTURING CO.
Brookside Park • Established 1894 • Cleveland 9, Ohio
AGENTS IN PRINCIPAL CITIES

ELECTRICAL BOOKS

PRINCIPLES OF ELECTRIC UTILITY ENGINEERING, *by Charles A. Powell, 251 pages, 6x9, John Wiley & Sons Inc., $6.*

The essentials of electric utility engineering are covered in this one volume, along with the corporate structure of a typical utility, definitions used in the business, federal and state controls of the industry and the financial return to be anticipated with given rates. The book is good basic training for young engineers just entering the electric utility industry.

ELEMENTS OF SERVOMECHANISM THEORY, *by George J. Thaler, 282 pages, 6x9, McGraw-Hill Book Co. Inc., $7.50.*

Elements of feedback control theory are presented at the undergraduate level. The book covers loop systems and offers sufficient material on multiloop systems to introduce the problems involved and the basic approaches to solutions. System equations and transfer functions are handled by circuit theory rather than the Laplace Transformation.

ASTM STANDARDS ON ELECTRICAL INSULATING MATERIALS, *660 pages, 6x9, American Society for Testing Materials, $5.50.*

Manufacturers, suppliers and users of electrical insulating materials will find this book of interest. Included are the latest ASTM methods of testing and specifications for electrical insulating materials. It contains 17 specifications, 60 methods of test, three recommended practices and a list of definitions; with 33 of the designations either new or revised.

HOT LINE TOOL GUIDE, *25 pages, Edison Electric Institute, 25c.*

This is a pictorial report by the subcommittee on hot line tools of the Accident Prevention Committee, Edison Electric Institute. General information on some of the present-day hot-line practices that are successful is presented with illustrations. It is intended to stress the accident-prevention phase of hot-line work.

BIBLIOGRAPHY AND ARSTRACTS ON ELECTRICAL CONTACTS, *80 pages, 6x9, American Society for Testing Materials, $1.*

This is a current supplement to previous references collected by the society. It carries a subject index, author index and numerical listing of references, with a separate section giving replacements and new references for the 1934-1950 period. Also available is the 1952 publication of references, which is 255 pages; costs $5.50.

SERVOMECHANISMS AND REGULATING SYSTEM DESIGN, *by Harold Chestnut and Robert W. Mayer, 384 pages, 6x9, John Wiley & Sons Inc., $8.50.*

This book states the problems met in the design of regulators and feedback control systems and develops methods for their solution. It is one of a series written in the interest of the advanced course in engineering of the General Electric Co.

Pneu-Draulic Operators Prove Dependability ...Low Maintenance

The *Pneu-Draulic* operator is in use on Allis-Chalmers breakers in many parts of the country. Its planned simplicity and reliability have led to quick and widespread acceptance.

Here are a few advantages of this operating mechanism:

★ **Dust** eliminated by virtual sealing of system.

★ **Corrosion** eliminated because oil in the system contains one of the best corrosion inhibitors known.

★ **Moisture** problems eliminated, since the system is filled with oil.

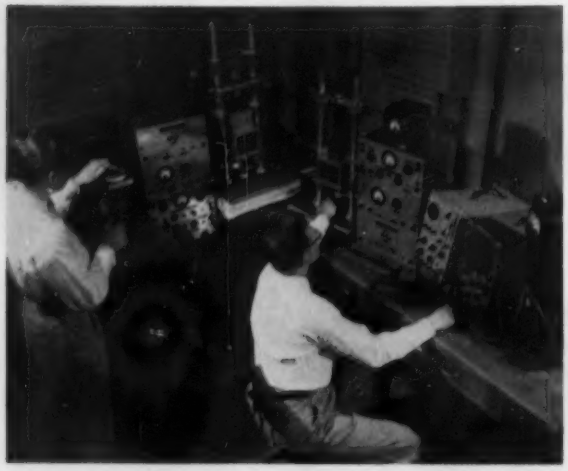
Get complete information on the *Pneu-Draulic* operator and the Allis-Chalmers breaker. Call your nearby A-C office, or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 71B7942.

A-4524

Pneu-Draulic is an Allis-Chalmers trademark.

ALLIS-CHALMERS

PRODUCT NEWS

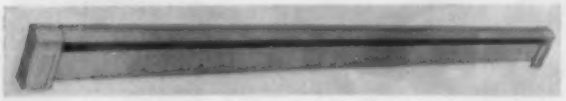


(1) MAGNETOSTRICTION, the expansion or shrinkage of steel in a magnetic field, and a major cause of transformer noise, writes its own record with the aid of equipment developed by Allis-Chalmers Research Laboratories. Physicists Daniel Wycklendt, left, and Dr. C. W. Little Jr. operate the equipment here. The company, on the basis of these studies, is predicting that quieter transformers may become a reality in the future. About 250,000 tests have been completed

Speed Drive Control

(2) General Electric Co., Apparatus Division, 1 River Road, Schenectady, N. Y.

Printed circuitry and a new, simplified control system are reported features of a new line of electronic adjustable speed drives available from this company. Control panels are current-carrying diagrams, easily inspected to locate circuit faults, the manufacturer says. Information is available at the company's apparatus sales offices.



Electric Space Heaters

(3) Electrovector Inc., 1660 E. New York Ave., Brooklyn 12, N. Y.

Two individual heating elements and a modulating thermostat are responsible for exceptionally even room temperatures where this new space heating equipment is used, according to the manufacturer. Effect of the arrangement is to provide low-intensity heat for moderate outside temperatures with one-half the unit's capacity while the second half is on reserve for periods of lower outside temperatures. Available in either baseboard (pictured) or cabinet-type units.

Aluminum Secondary Racks

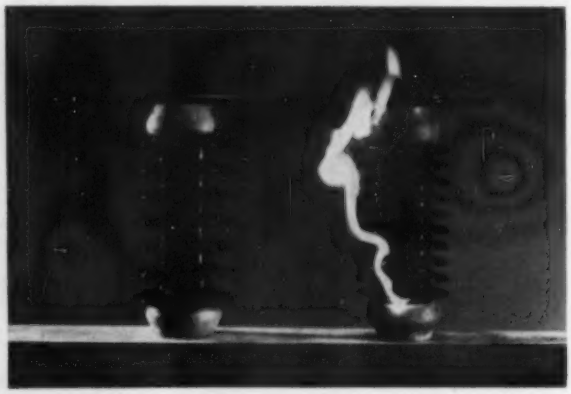
(4) Line Material Co., Milwaukee 1, Wis.

New lightweight secondary racks designed for pole mounting are being offered by this company. More uniform stress distribution resulting in greater strength and less deflection at maximum loadings are stated features. It is reported that it meets all EEI strength and deflection requirements for steel racks. Said to be interchangeable with most existing racks. An aluminum through-rod and cotter key are incorporated.

Carrier Equipment

(5) Motorola Communications & Electronics Inc., 4501 W. Augusta Blvd., Chicago 51, Ill.

New voice frequency carrier equipment specifically designed for transferred-trip protective relaying of power transmission lines has been announced by this manufacturer. It is claimed that primary protection by transferred-trip enables high-speed simultaneous opening of all circuit breakers in a line section. Operate time for the over-all relaying channel is 10 milliseconds, and four relaying channels can be transmitted over one voice channel. Reported components are long-life industrial-type tubes and hermetically sealed relays for added reliability.



Apparatus Insulators

(6) Locke Department, General Electric Co., P. O. Box 57, Baltimore 3, Md.

Corona and radio interference are reported to be reduced by this company's new line of station post apparatus insulators. The manufacturer says they offer excellent protection against flashover and service interruption because of contamination and fog. Voltage ratings range from 7.5 to 69 kv. The manufacturer states that wider hood spacing results in more effective natural cleaning by wind and rain, easier hot line washing and increased effectiveness of leakage surface. Pictured is new, left, and old under same voltage in test.

Prepared for trouble?

You don't have to be armed to the teeth to avoid communications trouble. Not when your communications are supplied by the Bell System.

A planned program of preventive maintenance is an important part of Bell System service. Its purpose is to prevent interruptions.

In the laboratory, technicians are continually developing new and more efficient equipment. In the field, Long Lines technicians frequently visit critical points of your communications system to observe conditions and to improve operations.

Alternate routings are an integral part of planning by communications engineers to protect your service and prevent interruptions.

The entire program is backed by the Bell System's 79 years of communications experience.

We supply the power industry with reliable private line telephone and teletypewriter service, maintain mobile radio facilities and provide channels for telemetering and supervisory control.

• • •

Bell System communications engineers will be glad to survey your communications needs without charge. Call your Bell Telephone representative today.

BELL TELEPHONE SYSTEM

TELEPHONE TELETYPEWRITER MOBILE RADIO TELEMETERING AND REMOTE CONTROL CHANNELS

Line Clearance Lift

(7) Maxwell Equipment Co., Ford St., Milford, Conn.

This manufacturer offers a new aerial lift designed for line clearance work. Sold as a package, everything from the truck to pneumatic pruner is included. Fiberglas crow's nest has no exposed metal parts and the upper boom is reported to be fully insulated. Reaches heights of more than 40 ft counting pruner length, and vertical reach is said to be 135°. Angle of horizontal rotation is reported to be 400°. Operated from crow's nest, with auxiliary controls at base for safety. Tree King and two men said to do work of former six-man crew.

Cleaning Spray

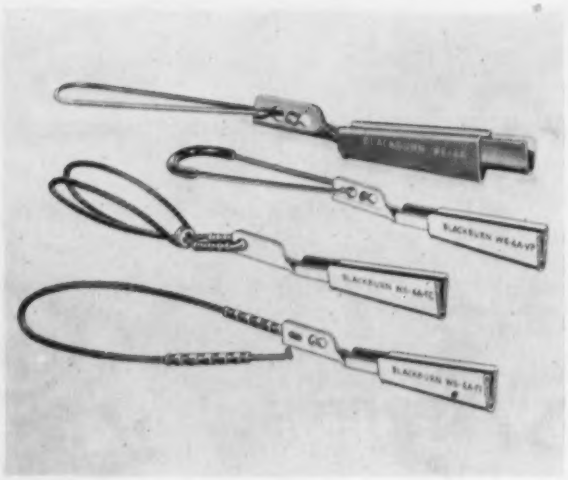
(8) E. I. du Pont de Nemours & Co., 6529 Nemours Bldg., Wilmington, Del.

Heavy deposits of grease and oil can be softened and loosened with a new aerosol spray developed by this company. Flushing with water after application is reported to complete the cleaning process. The manufacturer says that the product contains no acids or alkali.

Hinged Wireway

(9) Keystone Mfg. Co., 23328 Sherwood, Center Line, Mich.

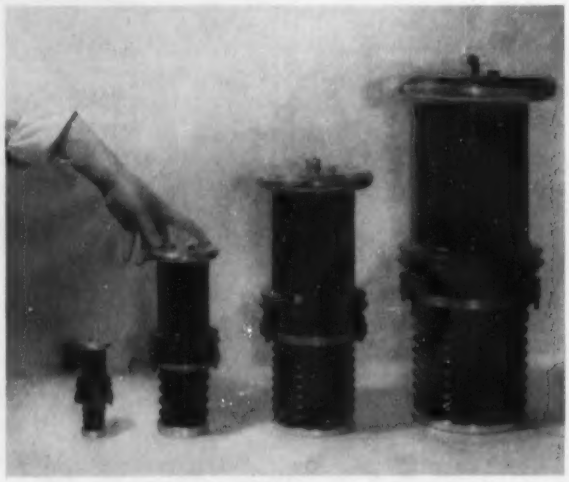
A new line of flangeless wireway, equipped with hinged covers, is being produced by this manufacturer. Auxiliary fittings with hinged covers allow installation of a complete wireway system in which conductors can be "laid in" rather than "fished through." Available in sizes 2½x2½ in., 4x4 in., 4x6 in., 6x6 in. and 8x8 in., in lengths of one through five feet.



Aluminum Service Clamps

(10) Jasper Blackburn Corp., 35 Madison St., St. Louis 6, Mo.

Four types of bails are now available for this company's aluminum service drop wire clamps. Two series of clamps cover sizes from 2 solid aluminum to 1/0 ACSR and 6 solid aluminum to 4 ACSR.



Corona-Free Bushings

(11) Lapp Insulator Co. Inc., LeRoy, N. Y.

This company announces a new series of special high-voltage apparatus bushings for corona-free operation. Designed for use in test transformers, direct current and special high-frequency applications, the bushings are available in voltage ratings of 25, 50, 75, 100, 125 and 150 kv. Designed for indoor, vertical upright mounting only, with the lower end in oil.

See Coupon on Page 78

For manufacturer's bulletins on these products, fill in and mail the coupon on page 78

ONLY FIVE SIZES HANDLE EVERY WIRING NEED — from No. 14 to 1,000 MCM! Smallness of design allows installation in limited space. The two largest grips are equipped with saddles that fit the curvature of the cable—assuring complete contact over the circumference of the conductor.

BULLDOG WIRE GRIPS PROVIDE

Positive Electrical Connections

quickly, easily

GREATER STRENGTH! MAXIMUM CONDUCTIVITY! COOLER OPERATION!

A twist—and the connection is secure! When you use BullDog Wire Grips, you *know* you've got a firm electrical contact that will *stay* in place—give maximum conductivity.

BullDog Wire Grips are all copper, cold-forged pressure connectors with greater tensile strength. They can take *all* the clamping pressure necessary for a strong, tight contact. Because they are silver coated they operate cooler, without power-robbing oxide formations. Clear wire holes permit full visibility. The connection to be made can be seen, guaranteeing full contact.

Standardize on easier-to-use, quick-connecting BullDog Wire Grips for all your jobs. They're available in open stock through your nearest Qualified BullDog Distributor. For catalog information write: BullDog Electric Products Company, Detroit 32, Michigan. ©DEPCO

IF IT'S NEW
. . . IF IT'S DIFFERENT
. . . IF IT'S BETTER . . . IT'S

BULLDOG

ELECTRIC PRODUCTS COMPANY
A Division of I-T-E Circuit Breaker Company

Export Division: 13 East 40th Street, New York 16, New York. ***In Canada:*** BullDog Electric Products Company (Canada), Ltd., 80 Clayson Road, Toronto 15, Ontario.

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

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YOUNG ELECTRIC & MFG. CO.
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Denver 2, Colorado

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910—89th Avenue
Oakland 21, California

BULLDOG ELEC. PROD. CO. OF LOS ANGELES
2885 E. Washington Blvd.
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IN EVERY LINE OF DUTY . . .

M.I.F. POLE HARDWARE MEANS DEPENDABLE PERFORMANCE

CROSSARM GAIN

DOUBLE GRID GAIN

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GRID GAIN

TIMBER CONNECTOR

POLE EYE PLATE

GUY HOOK

GUY CLAMPS

CURVED WASHERS

AERIAL CABLE SUSPENSION CLAMPS

POLE MOUNT

TRANSFORMER MOUNTING PLATE

POLE BEARING PLATE

Each M.I.F. Pole Hardware Specialty was designed to do a better job than had ever been done before. There is convincing proof of duty well performed on transmission and distribution lines from coast to coast. M.I.F. Pole Hardware can be depended upon to improve performance, simplify inventory and provide longer service life.

MALLEABLE IRON FITTINGS CO.

Pole Hardware Division Branford, Connecticut

N.Y. Office: 30 Church St. Boston Office: 250 Stuart St.

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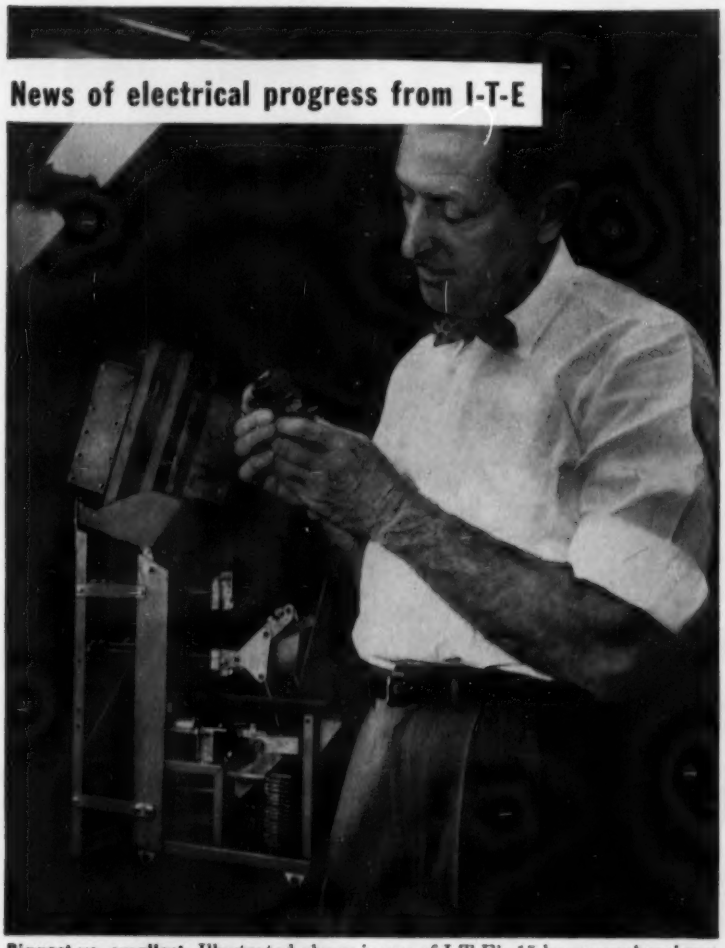
Representatives: William J. Cottrell Co., Portland, Ore. • James H. Drew Corp., Indianapolis, Ind. • Industrial Engr. & Equip. Corp., Los Angeles, Cal. • JSG Electric Co., Chicago, Ill., Lee-Smith Co., Miami, Fla. • B. H. McCoin, Knoxville, Tenn., • William J. O'Brien, Memphis, Tenn., • Robert P. Smith & Co., Jacksonville, Fla. • E. A. Thornwell, Inc., Atlanta, Georgia • J. P. Voight, Summerville, S.C. • Waltham, DeWitt & Krusi, San Francisco, Calif. • L. G. Wendegatz, Kansas City, Mo. • Williamson Sales Co., Shreveport and New Orleans, La.; Dallas and Houston, Tex. • O. C. Witte Co., Detroit, Mich.

News of electrical progress from I-T-E



Biggest vs. smallest. Illustrated above is one of I-T-E's 15 kv power breakers. Man holds tiny BullDog Pushmatic circuit breaker for use in 15 amp domestic lighting circuit—latest addition to I-T-E's family of products.

I-T-E SHAPES BROADER LINE

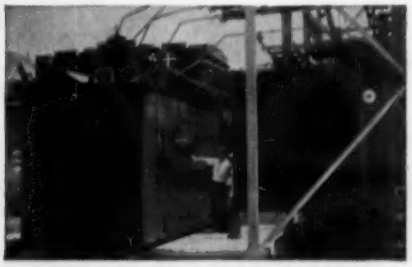
Air circuit breaker pioneer meets rising power trend with products reaching from utility to user

If predictions can be trusted, there's one thing Americans can be certain of during the next 10 years: electric power consumption will increase at least 100%. So again this year, I-T-E has further expanded its already broad line of products for power distribution.

Best-known products of I-T-E are its air circuit breakers—ingenious protective devices that automatically interrupt current flow in case of overloads, short circuits or other faults. Today, I-T-E's line of breakers ranges from the 15,000 volt class down to the tiny household lighting circuit breakers. Other I-T-E products include isolated phase bus, unit substations, switchgear, high voltage switches and insulators—all important elements in distributing and protecting the nation's power.

If you're planning new construction requiring electric power, take advantage of the economy and dependable performance that go with buying your complete power distribution equipment from I-T-E. Simply contact the I-T-E sales office nearest you. Or write I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Phila. 30, Pa.

Isolated phase bus. Carries power directly from the generator to first major primary substation. Rigidly braced heavy conductor is enclosed in a grounded metal housing.



Unit substation. A unit for reducing voltages, distributing power, and protecting equipment and personnel.

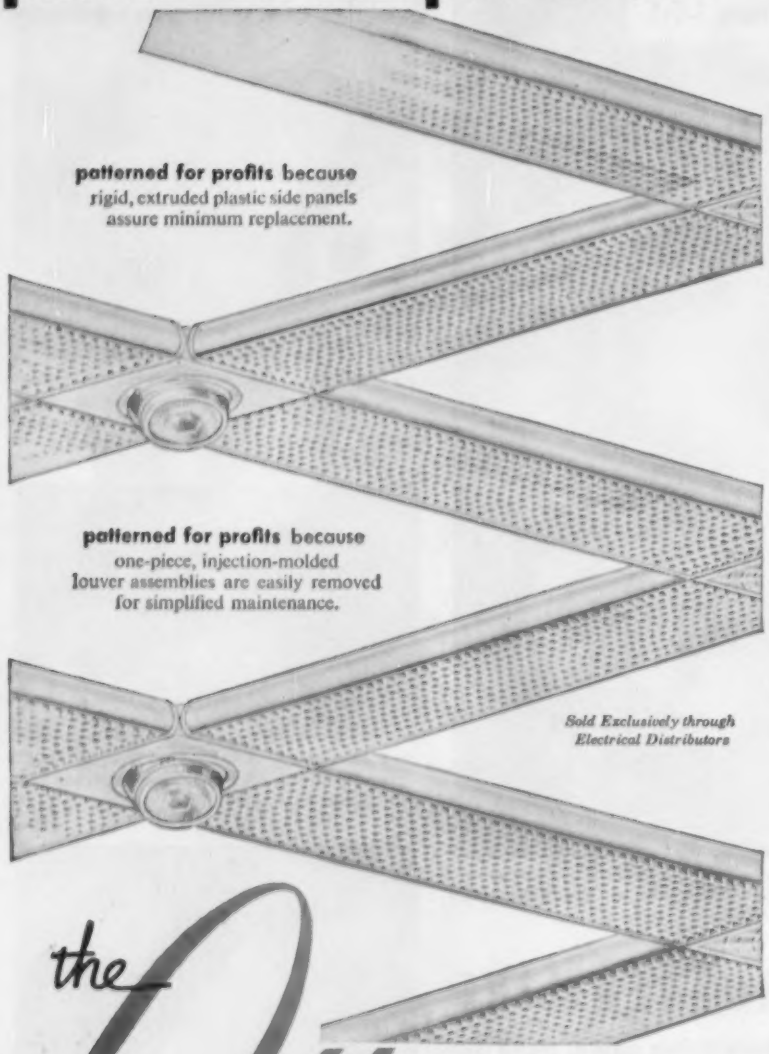
Molded case circuit breaker. This unit shown in metal enclosure provides dependable protection against overloads, short circuits, and other faults in individual circuits.

I-T-E

I-T-E CIRCUIT BREAKER COMPANY • Philadelphia, Pa. • Greensburg, Pa. • Victor, N.Y.

BullDog Electric Products Company, Detroit, Mich. • BullDog Electric Products Company (Canada) Ltd., Toronto • Eastern Power Devices Ltd., Toronto, Canada

patterned for profits . . .



patterned for profits because
rigid, extruded plastic side panels
assure minimum replacement.

patterned for profits because
one-piece, injection-molded
louver assemblies are easily removed
for simplified maintenance.

Sold Exclusively through Electrical Distributors

the Officer

The "Officer's" trim, graceful appearance is "profit-patterned" to increase store sales and profits, smarten up office decor and lift employee morale. It increases profits by cutting depreciation with rugged 18-gauge steel-channel construction, permitting absolutely flush mounting. Add to that, economical performance, trouble-free installation and simplified servicing, and you'll know why "Officer" is the ideal unit for any business where light plays an important part in the profit pattern. Send for FREE Bulletin AD 6306 on "profit-patterned" fluorescent lighting.

Benjamin Electric Mfg. Co., Leader Div., Dept. J, Des Plaines, Ill.

Exclusive licensee of the Leader Line in Canada: Robertson Irwin Ltd., Hamilton, Ontario

873

BENJAMIN Leader Line

Service Station Panel

(12) Square D Co., 4335 Valley Blvd., Los Angeles, Calif.

This service station panel is designed expressly for the control of gasoline dispensing where turbine pumps lift the gasoline from underground storage tanks. Known as 1183 L, the control panel contains magnetic starters for control and protection of turbine pump motors, metering facilities, an interlocked compressor-night light circuit and branch circuit protection of the other lighting and appliance circuits. Underwriters' Laboratories listed for service station.

Tube Cleaner

(13) Thomas C. Wilson Inc., Long Island City, N. Y.

Simplicity of operation in the removal of algae, slime and mud deposits in air conditioning tubes is a reported feature of this new electrically driven tube cleaner. The cleaner is designed for tubes ⅝ to ⅞ in. OD. The portable cleaner is powered by a ¼ hp, 3,450-rpm motor available in 110-120 v a-c, single phase only.

Transformers

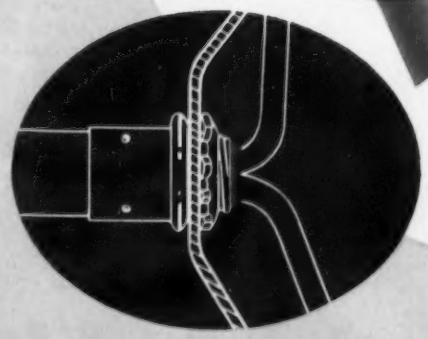
(14) Marcus Transformer Co. Inc., Leesville Ave., Rahway, N. J.

A new series of oil-immersed, self-cooled distribution and power transformers offered by this manufacturer is said to feature leakproof welded construction. The manufacturer states that efficiency of the series has been increased, along with lower weight, through use of grain-oriented, cold-rolled electrical steel for the magnetic circuit. Higher dielectric values are reportedly achieved in the coils with use of new insulation.

Red Throat

B-M 21 B, THE NEW INSULATED THROAT INDENTER CONNECTOR FOR E. M. T.

Four Ways Finer



1. Protruding rounded red plastic lip of bushing prevents cutting of insulation—eliminates shorts.
2. Full thread screws into all conduit fittings. Lip of RED THROAT bushing protects thread from damage.
3. Deep dished eight pronged lock nut is easier to drive on—screws flush to shoulder and digs into metal of box for vibration proof positive ground.
4. Permanent locked-in bushing insures smooth burr-free raceway for easy fishing. No extra work and costs no more.

Briegel, the Original Indenter Fittings are neater in appearance, easier and faster to use. Installation is simple and less expensive. Two quick squeezes sets them forever. Try B-M Indenter Fittings and get more profits from each job!

ALL BRIEGEL FITTINGS ARE U. L. APPROVED AS CONCRETE-TIGHT

Order from Your Wholesaler!

All B-M Indenter Fittings are U.L. Approved as concrete-tight and for general use (File Card E10863). Also comply With Federal Specifications W-F-406.

BRIEGEL METHOD TOOL CO.

GALVA • ILLINOIS

Warehouse Stocks in Principal Cities for Immediate Delivery!

SALES AGENTS FOR THE ELEVEN WESTERN STATES

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L. D. Hood Sales
1133 West 8th Avenue
Denver, Colorado

W. W. Wheat & Son
2219—4th Avenue
Seattle 1, Washington

Even rocks won't stop this Tel·E·Lect digger!

- **Time Tested, Proven, Accepted**
- **Used by Public Utilities Everywhere**
- **Operates on Any Derrick Truck**
- **Nationwide Sales-Service Facilities**

Rugged construction from hardened steel auger to power take-off lets this time-tested Tel-E-Lect Pole Hole Digger work in all soil conditions . . . smart design lets Tel-E-Lect's digger reach up on hills, down into ditches, or across obstacles—anywhere up to 20 feet behind the truck!

Put this low cost, industry accepted unit on the front or rear of your utility truck . . . see your two-man crew dig a hole and set a pole in less than five minutes. The Tel-E-Lect digger will bore clean holes 10 feet deep. Interchangeable augers 8" to 20" in diameter are offered.

The digger is lifted by truck's boom and winch. Engine power is delivered to the digger through a telescoping drive shaft and the auger can be rotated in either direction by shifting the PTO.

All Tel-E-Lect products are sold and serviced through a nationwide distributorship plan. You'll find your local dealer listed under "Trucks-Equipment" in the yellow pages, or *write direct for complete information.*

This 2-man utility truck is completely equipped by Tel-E-Lect. Its derrick and digger are stowed overhead for travel.

Once on the job, the derrick and digger are raised automatically with the winch . . . no need for a big crew with this compact unit.

In two minutes the Tel-E-Lect derrick and digger are in position, ready to work. Note that the pole is used as additional weight to force the auger into the frozen ground.

Distributed by: AM. EQUIPMENT & BODY CO., Los Angeles 33; COLE COMM. CO., Seattle, Wash.; SAGUARO BODY & EQUIP. CO., Phoenix, Arizona; UTILITY BODY CO., Oakland 7; WILLIAMSON BODY & EQUIP. CO., Ogden, Utah

Tel·E·Lect PRODUCTS, INC.

10,025 Minnetonka Boulevard Minneapolis 16, Minnesota

Insulators

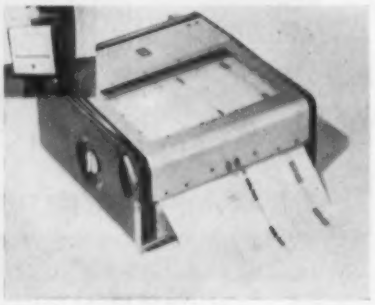
(15) Line Material Co., Milwaukee 1, Wis.

Designed for service on transmission and subtransmission systems, these new pin-type insulators are available with either plain or radio-free glaze. Manufactured in the EEI-NEMA class 56-1 through 56-5.

Aluminum Antirust Paint

(16) The Monroe Co. Inc., 10703 Quebec Ave., Cleveland 6, Ohio

A new "one coat" aluminum antirust paint is announced by this company. The paint is made of doubly pigmented aluminum mixed with a colorless base vehicle that is claimed to facilitate better "leafing" of aluminum flakes to form a moistureproof coating. Said to be specially well adapted for roller application. Known as Rust-Cure XX. More information in bulletin 136-11.



Portable Oscillographs

(17) Brush Electronics Co., 3405 Perkins Ave., Cleveland 14, Ohio

Lightweight, portable oscillographs are the new developments in the field of recording instruments announced by this company. Designed for either four or six channels, the two models weigh 36 and 48 lb and are equipped for either ink or electric writing.

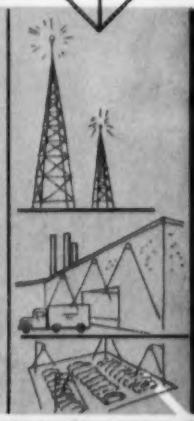
FISHER-PIERCE PHOTOELECTRIC CONTROLS

for every lighting system requirement

The extreme versatility and quality of Fisher-Pierce photoelectric lighting controls is evidenced by their widespread use over the past eight years, in controlling hundreds of street lighting systems . . . aircraft obstruction and beacon lights . . . outdoor signs and store window lights . . . parking, loading and storage area lights . . . poultry house and roadside telephone illumination, etc. All Fisher-Pierce controls employ a basic circuit whose dependability, ruggedness and trouble-free performance have been proven in use.

SERIES 63300C CONTROLS

Rugged, easily installed, accessible units for switching up to 3000 watts of lighting load. For operation at 105-130 or 210-250 V, 50-60 cycles. Standard models come with SPST, SPDT, or DPST power contactors. Special models are available with a switching capacity of 6000 watts. The electronic chassis is enclosed in a weatherproof watt-hour meter case assembly which plugs into a standard meter socket. The new 63300C design represents the results of eight years' extensive, specialized experience in the field.



SERIES 64400 CONTROLS

Small, compact, low cost units for switching 1000 watts of incandescent, mercury or sodium vapor lamps at 120 V, 50-60 cycles. Designed for use as an integral part of various manufacturers' luminaires, as well as for ballast, pole top, cross arm, standard and other mountings. Low initial cost and low maintenance make the use of one Series 64400 control per lamp economically practical for new street lighting installations and isolated locations.

THE ***nitelighter***

. . . for automatic control of home lights

An inexpensive, compact, automatic control made especially for domestic use. Operates on 110 volts AC, switches up to 300 watts. Plug lamp to be controlled into NITELIGHTER plug, face "eye" toward window; living room, hall, garage lights, etc. go on at dusk, off at dawn automatically and without attention. You'll never come home to darkness. Protects the home when you're away. Get it at your dealer, or if he cannot supply you, send a check or money order for $15.95. A NITELIGHTER will be sent postpaid and insured.

Series 100

MULTIPLE RELAYS FOR SWITCHING LOW VOLTAGE OUTDOOR LIGHTING CIRCUITS

Fisher-Pierce multiple relays incorporate a maintenance-free mercury plunger relay conservatively rated to switch 30 amps. at 110-115 volts AC. Series 100 relay is housed in a standard meter case and is available with or without line and coil protective equipment. The low cost Series 200 (not shown) is housed in a weatherproof cast aluminum case. Both series are designed for outdoor use as pilot wire control or for cascading street lighting circuits. Available with normally open or normally closed relays.

Complete Specifications and Data Available on Request

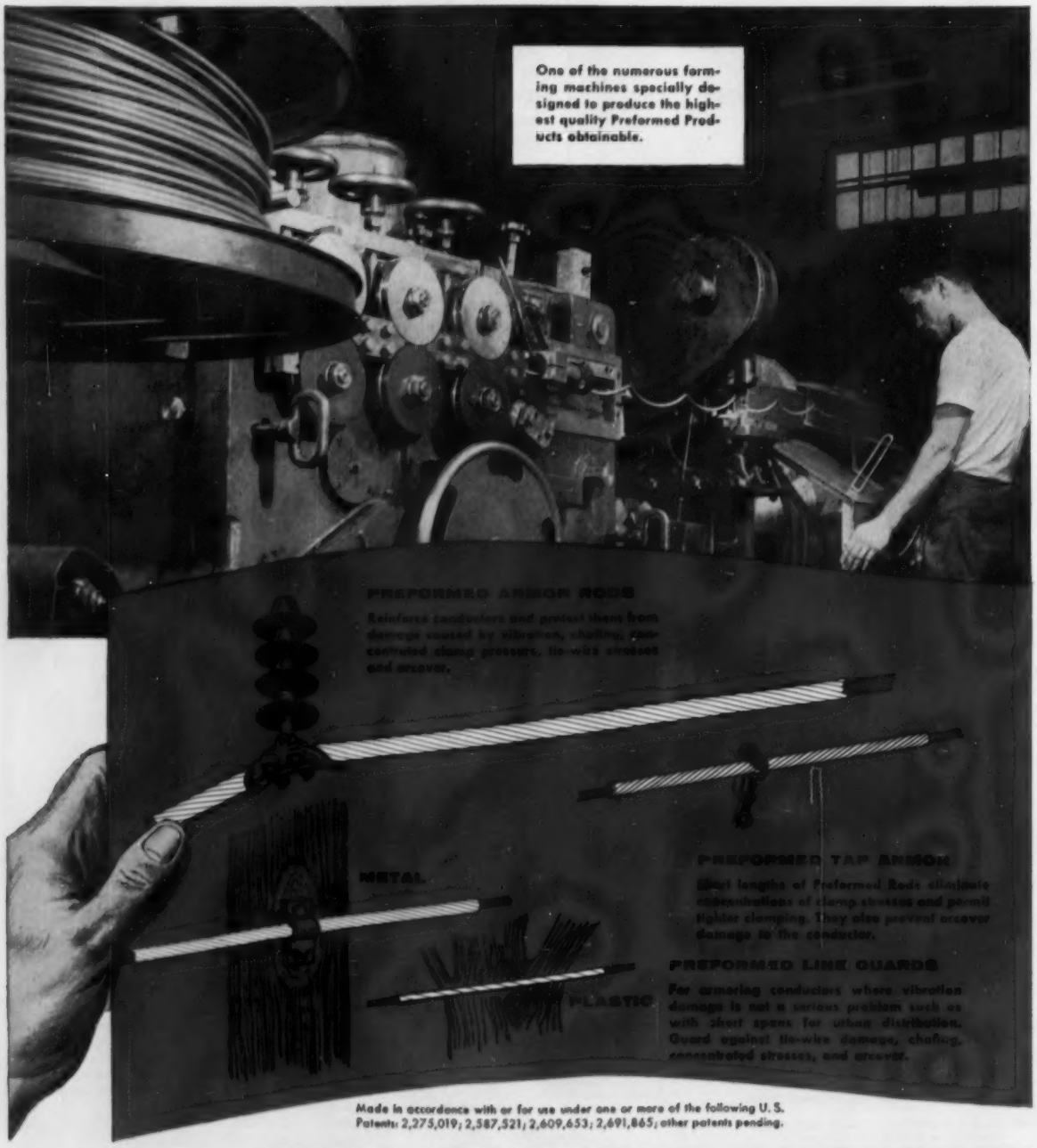
THE FISHER-PIERCE COMPANY, INC.

43 Pearl Street, So. Braintree, Boston 85, Mass.

EXPORT: PHILLIPS EXPORT CORP. DIVISION OF NORTH AMERICAN PHILLIPS 100 E. 42ND STREET NEW YORK 17, N. Y.

IN CANADA: NORTHERN ELECTRIC CO., Ltd.

PREFORMED


One of the numerous forming machines specially designed to produce the highest quality Preformed Products obtainable.
PREFORMED ARMOR RODS
Reinforce conductors and protect them from damage caused by vibration, chafing, concentrated clamp pressure, tie-wire stresses and crossover.
METAL
PLASTIC
PREFORMED TAP ARMOR
Short lengths of Preformed Rods eliminate concentrations of clamp stresses and permit tighter clamping. They also prevent crossover damage to the conductor.
PREFORMED LINE GUARDS
For armoring conductors where vibration damage is not a serious problem such as with short spans for urban distribution. Guard against tie-wire damage, chafing, concentrated stresses, and crossover.

Made in accordance with or for use under one or more of the following U. S. Patents: 2,275,019; 2,587,521; 2,609,653; 2,691,865; other patents pending.

PREFORMED LINE PRODUCTS COMPANY

5349 ST. CLAIR AVENUE, CLEVELAND 3, OHIO

TELEPHONE: CLEVELAND EXPRESS 1-3571

PRODUCTS

proved performance

The precision manufacturing equipment at Preformed Line Products Company has been especially designed to produce uniform, accurate rods for all Preformed Products. That's why one PLP Rod is exactly the same as another of the same size and why all pitches within each rod are absolutely uniform. This precision equipment plus the skill accumulated in years of manufacturing Preformed Products guarantees that they meet the exacting specifications developed in the laboratories of the Preformed Line Products Company.

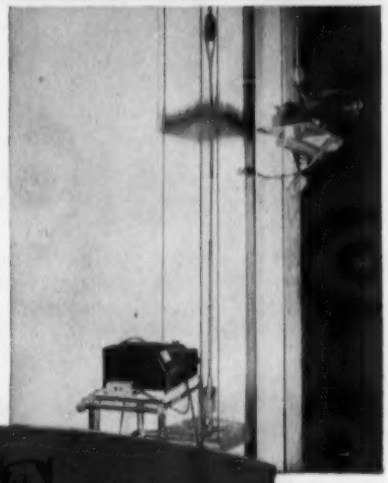
Preformed Research and Development Laboratories are the main reason why the demand for more and more Preformed Products is constantly increasing. From these laboratories (which have been continually enlarged in both staff and the most modern research equipment) has sprung the whole new Preformed concept of fittings, the most advanced development in this field in recent decades.

All Preformed Products are designed to hold the conductor or strand with low radial pressure over a large area that is free of concentrated stress at any point. Bolts or other holding devices are eliminated—providing economies unobtainable with any other type of fittings.

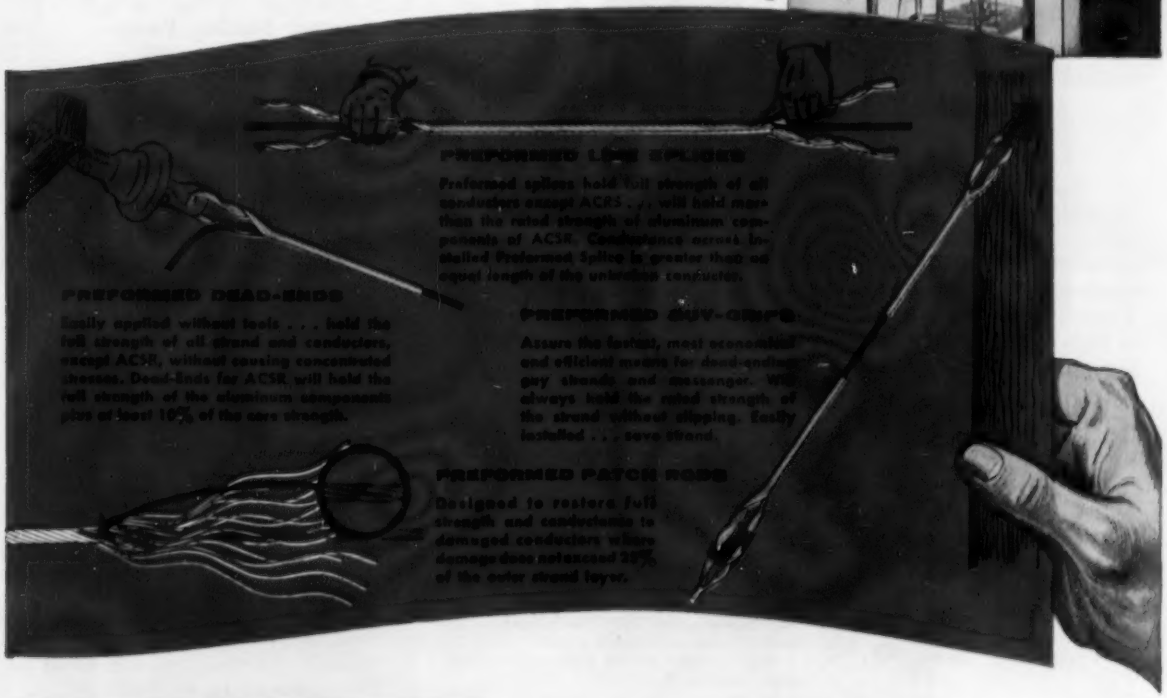
For more information on their exclusive advantages, ask your local PLP Representative.

a Static tension tests prove the holding ability of Preformed Products under high stress.

b Severe repeated load tests are regularly conducted in the Preformed Laboratory.



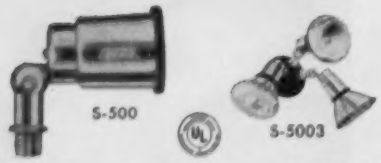
c Preformed Products withstand tremendous impact — another routine quality control test.

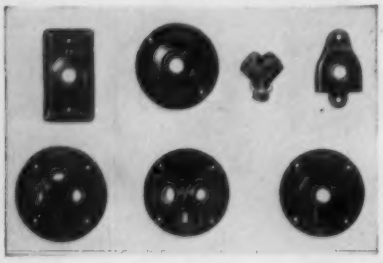


SALES REPRESENTATIVES C. B. Anderson Co., *Tulsa, Oklahoma City, Amarillo* • Belcher and Associates, Inc., *Jacksonville, Miami* • Bergstrom-Verburg Co., *Minneapolis* • Harry J. Billica, *San Mateo* Vincent J. Brown Co., *Buffalo* • Burns Electric Co., *Pittsburgh* • F. C. Clatterbaugh, *Omaha* • Earl S. Condon Co., *Los Angeles* • Cory and Crum, *Indianapolis* • The Electrical Distributors Co., *Philadelphia* • Engineer Sales Co. of Carolina, *Columbia* • J S G Electric Co., *Chicago* • E. L. Flowers, *Boston* • George R. Horne and Co., *Dearborn* • Johnson Sales Co., *Bay City* • H. L. Macon and Co., *Atlanta* • Peterson Co., *Denver* • Elgin B. Robertson, Inc., *Dallas, Houston* • K. M. Ryals Co., *San Francisco* • Shaffer and Nelson, *Portland, Seattle, Spokane* • M. H. Snyder & Sons, *New York* Curtis H. Stout & Co., *Little Rock, Memphis, New Orleans* • L. G. Wendegatz, *Kansas City*

LIGHTING AT ITS ECONOMICAL BEST...

STEBER FLOODLIGHTS AND SEALED BEAM COMPONENTS



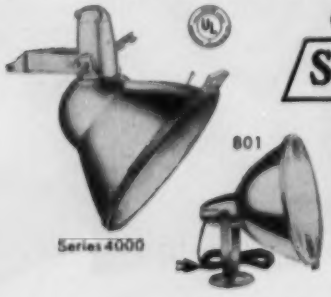


CHROME PLATED STEBERLITES WITH FITTINGS FINISHED IN RICH BLACK!

Lustre—liveliness—sales appeal! Chrome plated Steberlites have it! The brilliant plated surface of the S-500, richly contrasted by deep black weatherproof lamp gasket and mounting flanges finished in colonial black, provides that magic touch which makes a Steberlite installation outstanding. S-500 Steberlites are fully adjustable, are factory wired and accommodate PAR-38 and R-40 medium base lamps. The mounting flanges provide for easy attachment to wall or pole, switch or outlet box—in single, two or three lamp combinations.

STEBER VAPORTITE FIXTURES

Especially designed for both indoor and outdoor use. Heavy cast aluminum construction resists moisture, salt spray, smoke, non-explosive dust, gas and most chemical fumes. Extra thick cork gaskets provided for perfect seal between splice box and fixture and glass globe and fixture cap. Types for mounting to outlet box or to vertical or horizontal ½" conduit or pipe. Each unit can be furnished with welded wire guard to protect globe from breakage. For 100 or 200 watt lamp.



OPEN AND ENCLOSED STEBER FLOODLIGHTS

Economical Steber floodlights are available in both open and enclosed types for lamps from 100 to 1500 watts. Each unit has ample wiring compartment (or is fully wired with cord and plug), and versatile mounting bracket for quick, easy installation. Ideal for all industrial, commercial and sports areas.

New Steber Catalog TDS-9 gives complete details. Write now.

STEBER MANUFACTURING CO.
DEPT. 57, BROADVIEW (MAYWOOD P.O.) ILLINOIS

STEBER

Steber Manufacturing Co. of California
242 So. Anderson St.
Los Angeles 33, California

Steber-Woodhouse Ltd.
2368 Dundas St. West
Toronto, Canada

Miniature Volt-Ammeter

(18) Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.

Portability is an outstanding feature of this pocket-size clamp volt-ammeter with a single scale for all ranges and functions. Shock-mounted instrument movement safeguards instrument accuracy and makes it more durable, the manufacturer reports.

Contact Sealing Paste

(19) A. B. Chance Co., Centralia, Mo.

A new electrical contact sealing paste, said to be better for aluminum, copper and bimetal connections, has been developed by this manufacturer. The compound guards against corrosion and improves conductivity on all types of connections, the manufacturer states. It is reported to maintain its original consistency through a temperature range of −25° to 340°.

Raceway Insulation

(20) The Thomas & Betts Co., 36 Butler St., Elizabeth, N. J.

Built-in plastic bushing at raceway outlets is a new development by this manufacturer. The colored bushings help prevent wear on wire insulation at outlets of EMT, rigid and flexible raceways. The manufacturer also reports that the effort to pull wire through the raceways is reduced by 50% with the plastic bushings.

(21) FACE SHIELDS—Clip-on and swing-back type Lumerith Acetate face shields offering protection against heat, liquid splashes, flying metal and wood fragments are made by the E. D. Bullard Co., 275 Eighth St., San Francisco 3, Calif. They are for use with safety hard hats and caps.

Simplify those HARD-TO-HANDLE installations with U. S. GRIZZLY Pre-assembled Aerial Cables

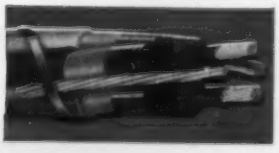
Check the following advantages of U.S. Grizzly® Pre-assembled aerial cables over ordinary open-wiring installations.

1. Less tree trimming is required, and therefore is less objectionable to the community. Can usually be installed in a more direct route.

2. Longer spans and fewer poles due to messenger's great strength.

3. Better appearance because of the elimination of cross-arms and less congestion at the poles.

4. Better service continuity because of high strength supporting messenger.



U. S. Grizzly pre-assembled aerial cable, 15,000 volts. Type RR —3 conductor, Uskor-ona® ozone-resistant insulation — shielded — Neoprene jacket.

5. Better voltage regulation because the conductors are bound closer together.

6. Lower installation and maintenance costs.

7. Permits shorter poles.

8. Made by United States Rubber Company, specialists in electrical insulation, the only electrical wire and cable producer to grow its own natural rubber, make its own synthetic rubber and manufacture its own plastics.

For more information, write to address below.

FREE BOOKLET

Write for your copy of free booklet giving full information about U.S. Electrical Wires and Cables for the Electric Utility Industry.

US RUBBER

UNITED STATES RUBBER COMPANY

Electrical Wire and Cable Department • Rockefeller Center, New York 20, N. Y.

(22) NIGHT WORK is made easier by this novel use of a Clark Equipment Co. fork truck. One company used this arrangement in a materials storage yard for late unloading of trucks. The improvised tower for the lights can be used on the ground or elevated on the fork lift as pictured here.

Visual Aid Kit

(23) Ultra-Violet Products Inc., San Gabriel, Calif.

Lectures, demonstrations, sales talks and training sessions are among the ways this new black light kit can be effectively used, according to the manufacturer. In the kit are chalks (1), crayons (2), tempera colors (3), colored yarns (4), assorted cardboards (5), invisible ink (6), mechanical pencil with invisible lead (7), and grease pencils (8). Items can also be purchased separately.

Air Conditioning Starter

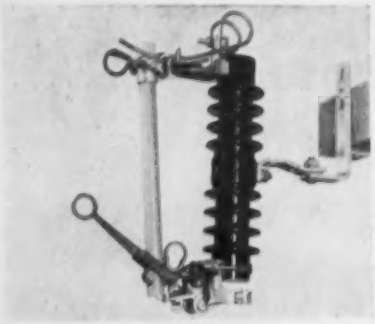
(24) Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

A complete new design in overload relays for close motor protection is the outstanding feature of a new air conditioning starter announced by this manufacturer. Available in 20- and 30-amp ratings.

Aerial Cable Clamp

(25) Hendrix Wire & Cable Corp., Boston 18, Mass.

A new 5-kv Tri-3 aerial cable clamp is now available as a separate item for use on secondary distribution circuits. Made of molded acrylic resin, the clamps can be used with vinyl, polyethylene and neoprene-covered line wires on single- and three-phase aerial circuits operating at 600 v or less. The clamp spaces the phase conductors equilaterally three inches center to center, providing good voltage regulation and with ample room for making service taps at the pole or midspan, the manufacturer reports. Information also available from Reynolds Metals Co., General Sales, Louisville 1, Ky.



Load Break Cutout

(26) R&IE Equipment Division, I-T-E Circuit Breaker Co., Greensburg, Pa.

This new load break cutout features a new lock-in device that locks the fuse holder in closed position during the load break operation, it is reported. The feature is said to confine all arcing in the fuse tube while the loading lever is being operated. The current rating is 100 amp, with interrupting capacities up to 10,000 amp. Available in voltages of 5.2-, 7.8-, 15- and 18-kv maximum design.

(27) COATING — A resilient dielectric coating or encapsulating material for extreme temperature electric and electronic components has been announced by Dow Corning Corp., Midland, Mich. Identified as Silastic S-2007, the new silicone rubber cures in two to four hours at 200 C to form a rubberlike jacket, claimed to be uniform, heat-stable, moistureproof and highly resistant to oxidation, ozone and weathering. According to the manufacturer, tests indicate that transformers properly coated with this material will pass both the moisture resistant and low flexibility requirements of MIL-T-27 grade 1. Fully cured coatings have about twice the thermal conductivity of conventional resinous or rubber dielectrics, assuring cooler operation at high temperatures, it is stated.

Fill in Coupon on Page 78

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CUSTOM-ENGINEERED—More Tractive Power —Less Dead Weight—through Stronger, Lighter Alloy Steels and Advanced Math-Matic Design!

This basic unit of heavy-duty driving power is designed to out-perform mass produced, mass marketed trucks on the basis of extra power, dependability and economy of operation. Advanced *Math-Matic Design*—in every feature of FWD—correctly proportions power to weight on front and rear axles . . . makes every pound of load help haul itself, turns every ounce of power into more controllable traction and greater steering safety. You'll find FWDs shouldering more than their share wherever there's tough, heavy work to be done. Let us show you how FWD fits into *your* picture . . . contact your FWD Dealer today!

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THE FOUR WHEEL DRIVE AUTO COMPANY, CLINTONVILLE, WISCONSIN, *Canadian Factory,* KITCHENER, ONTARIO

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Write for literature giving complete data and further details or send us specifications or blueprints for our Engineers' recommendations.

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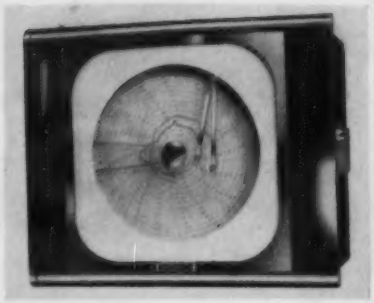

Potentiometer Recorder

(28) The Bristol Co., Waterbury 20, Conn.

Two continuous records can be made at the same time with this recorder. The manufacturer says that the potentiometer and bridge instruments can be used to measure and control any variable that can be translated into an electrical quantity. Reported to be effective for keeping two records that must be compared with respect to the magnitude and time of any variations.

Switches

(29) Arrow-Hart & Hegeman Electric Co., Hartford, Conn.

Screwless terminals and built-in shunts eliminate the need for pigtailing and splicing, according to the manufacturer of these new switches. The shunts are said to permit continuous wiring from one switch to another in multiple gang installations. Model Q-21 has a grounding line internal shunt with the toggle controlling the hot line. Model Q-22 has the hot line supplying current to two screwless terminals, one of which can be switched on or off.

Low-Voltage Breakers

(30) Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis.

Completely dead-front construction, bridge-type contacts without flexible leads or pigtails, inductive series trip arrangement in higher ratings, hermetically sealed time delay service for trip mechanism and individual phase trip indication are some of the features itemized by the manufacturer in regard to these new breakers. LA-25 has a solenoid operating mechanism; LA-50 closes with a hydraulic system. The first is rated 40 to 600 amp, 25,000 amp interrupting capacity at 600 v; the second 200 to 1,600 amp, 50,000 amp interrupting capacity at 600 v. Dead-front construction provides an insulated shield around front and sides.

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Work Areas where workmen may be concealed from operators of moving equipment.

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Why CLIFTON Rigid Conduit? Because only CLIFTON Conduit has the extra protection of a heavy zinc coating on both the inside and the outside . . . applied by Clifton's special hot-dip method!

Why CLIFTON E.M.T.? Because CLIFTON hot-dip E.M.T. gives double the zinc protection of ordinary E.M.T.! This famous CLIFTON tubing can be bent and angled without chipping and flaking. It is the most durable electrical metallic tubing made and is distinctive by its brightness!

Why CLIFTON Armored Cable? Because CLIFTON Armored Cable in both CX and CXL (lead sheathed) is made with 2, 3, & 4 conductors encased in an extremely smooth and flexible armor of zinc-plated steel. CLIFTON Armored Cable assures years of dependable service!

Power and Light Lines are the Lifelines Everywhere . . . . and CLIFTON CONDUIT Carries the Load Best!

Why CLIFTON Un-Armored Service Entrance Cable? Because CLIFTON 2 & 3-Conductor Service Entrance Cable is manufactured under the most stringent conditions to make it absolutely impervious to moisture! Special rubber coated "Mylar" tape—is used in all CLIFTON Service Entrance Cable!

Why CLIFTON Non-Metallic Sheathed Cable? ("CLIFTX") Because "CLIFTX" is protected against moisture and rot. With a tightly braided fibreglas covering, saturated with an asphalt compound, CLIFTON cable is silver finished and further protected with a thin coating of high-melting point wax.

Why CLIFTON Flexible Steel Conduit? Because Clifton Flexible Cable is made in such a manner as to always have a more uniformly smoother surface. This makes for easier handling and pulling!

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Here's strength, safety on heavy loads—for blocks, tackles and hoists. Klein Safety Snap Hooks are time savers, too, eliminating the necessity of taping or wiring the throat. Made of drop forged steel—carry a working load of 8,000 pounds with adequate safety factor. Snap on easily with one hand—may be used on any conventional steel block 6 inches or smaller, or on chain hoists or snatch blocks. Four types regularly available. Specify 455-SH-3 Snap for use with 1½-ton hoists . . . No. 455-SP for double chain hoists and for attachment at housing. Klein can also supply safety snap hooks for lighter loads.

455 Solid Eye

455-S Swivel Eye

455-SH Swivel Eye

455-SP

Foreign Distributor: International Standard Electric Corp., New York

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Write for your free copy of the Klein Pocket Tool Guide today!

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7200 McCORMICK ROAD • CHICAGO 45, ILLINOIS

Portable Telephone

(31) Wheeler Insulated Wire Co., Waterbury, Conn.

Communications are made easily with a portable, reel-type field telephone that does not require batteries or other power sources, according to this manufacturer. The compact reel holds up to 400 ft of telephone cable, although the basic length supplied is 250 ft.

Plug-In Energizer

(32) Pyramid Instrument Corp., 630 Merrick Rd., Lynbrook, N. Y.

Voltage at the wall outlet can be measured while an appliance is on the line with the use of this new product. Another feature stated by the manufacturer is heavy-duty construction that increases the capacity to 25 amp for d-c readings and 10 amp for 10 times sensitivity readings. Readings are made with a snap-around volt-ammeter, not included with the energizer.

Weed and Brush Killer

(33) E. I. du Pont de Nemours & Co., Du Pont Bldg., Wilmington 98, Del.

A new formulation of weed and brush killer announced by this company contains 95% of the active ingredient, ammonium sulfamate. Known as Ammate X, the new compound is reported to be effective as a foliage spray for control of woody plants and as a stump treatment to prevent resprouting. Right-of-way maintenance costs are reportedly reduced by use of the new product. It is said to be nonvolatile, does not leave soil unproductive for long, contains a corrosion inhibitor and is reportedly low in toxic hazard to people and animals when used as directed.

Covered Receptacles

(34) Slater Electric & Mfg. Co. Inc., 56th St. and 37th Ave., Woodside, N. Y.

Four weatherproof receptacles with self-closing covers are new products of this company. The four are: a duplex convenience outlet, a single parallel slot receptacle, a single T-slot receptacle and a single U-shaped grounding-type receptacle, meeting NEMA and ASA standards, 125 v, 15 amp, the manufacturer reports. Aluminum finished brass plates and cast aluminum covers with stainless steel springs are features of the receptacles.

Breather Valve

(35) James-Pond-Clark, 2181 E. Foothill Blvd., Pasadena 8, Calif.

A dual relief valve designed to meet ASTM requirements and capable of controlling temperature-induced pressure changes in oil-filled power transformers is available in a unit package from this manufacturer. The single unit controls pressure within plus or minus 5 psi from atmospheric pressure. The unit can be installed from outside the transformer case in a standard gage fitting, according to the manufacturer.

Cable and Tube Stapler

(36) The Heller Co., 2153 E. Superior Ave., Cleveland 14, Ohio.

Light in weight, this hand-operated stapler is reported to be a timesaver in installation of electric cable lines and copper tubing. The gun shoots a heavy staple with each squeeze of the trigger, fastening cables or tubes to many types of building materials. Staples available in various leg lengths up to ¾ in.

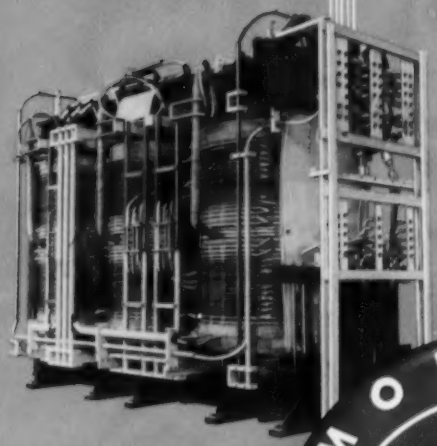
Cable Stripper

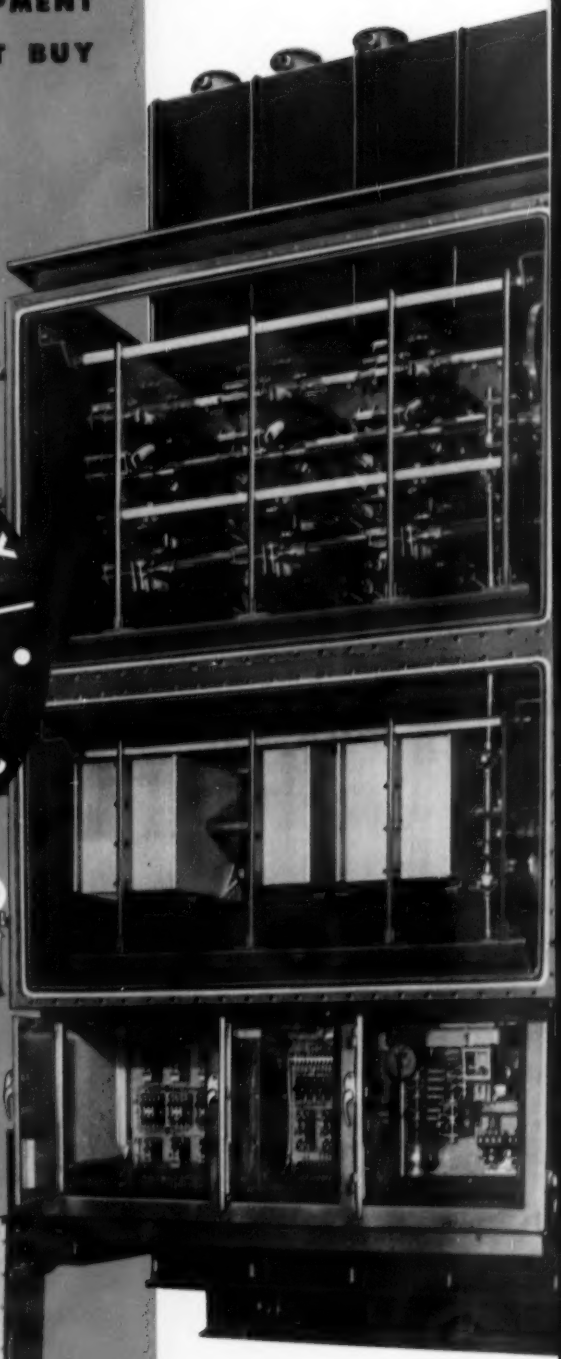
(37) Taca Cable Stripper Mfg. Corp., 1313 N. Mission Rd., Los Angeles, Calif.

Three models with various types of designs and sizes give a wide selection of cable stripping equipment for different types and sizes of cable, according to this manufacturer. It is reported that the three models are designed for stripping any kind of cable used in telephone, radio and electronics through the use of various yokes. Model R has friction brake for additional control on long cuts; model X is for casual users and short cuts; model V is for circumferential and straight cuts.

ANY WAY YOU LOOK AT IT

MOLONEY LOAD TAP CHANGING EQUIPMENT ... IS YOUR BEST BUY





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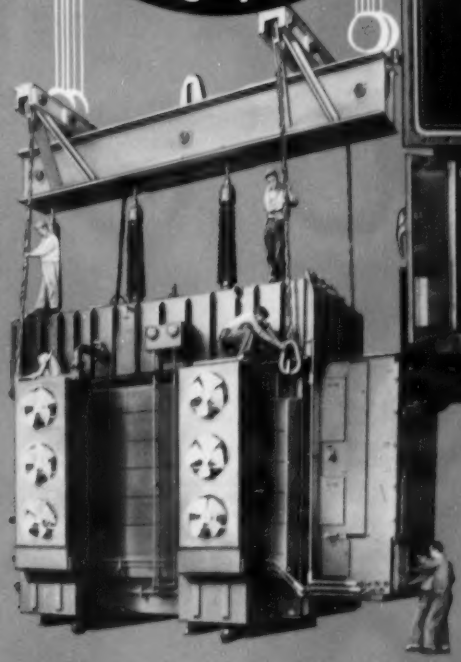
Whether you look at it from the Core and Coil Unit with its switching reactor, or from the Switch, with its individual oil compartment, or from the completely assembled apparatus, Moloney offers design and engineering knowhow plus fabrication and assembly skill that results in ... Dependability at its best.



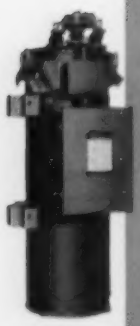
MOLONEY ELECTRIC COMPANY

Bulletin LTC2906-155

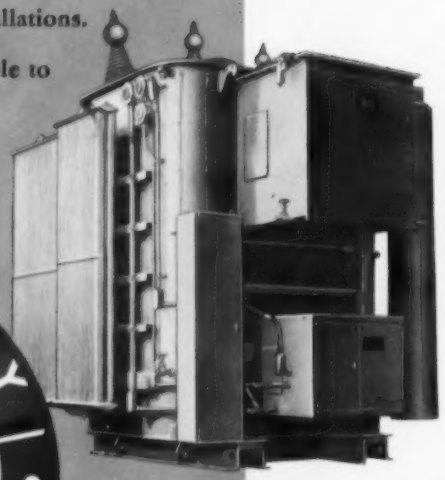
ANY WAY YOU USE IT...

MOLONEY LOAD TAP CHANGING EQUIPMENT IS YOUR BEST BUY

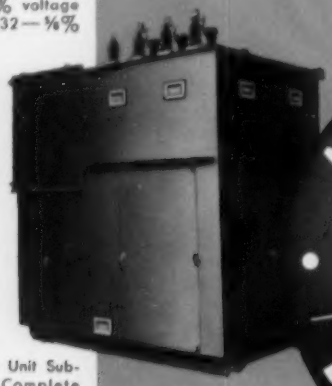
Regardless of the application, Moloney Load Tap Changing Equipment is your best buy and is available for both standard and special installations. Moloney engineering consultation is available to utilities and industry for special application problems.



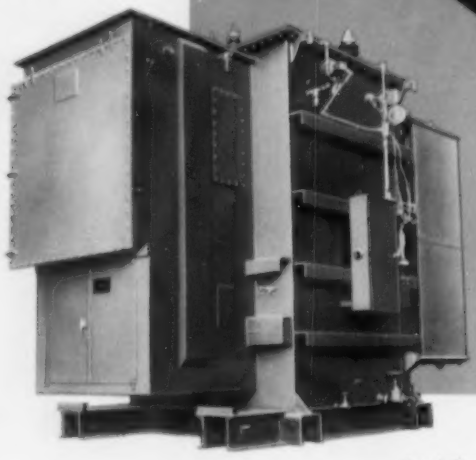
Single Phase Pole Type & Station Type Feeder Voltage Regulators. Plus or minus 10% voltage regulation in 32—⅝% steps.

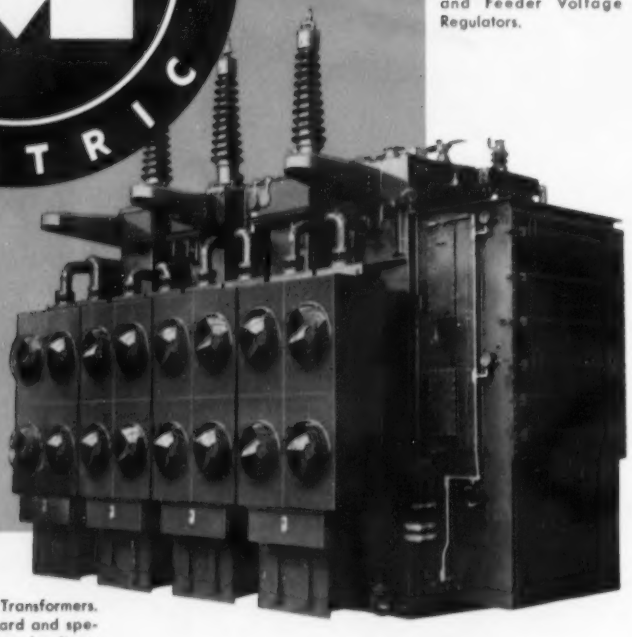


Regulating Transformers and Feeder Voltage Regulators.



Single Circuit Unit Substations. A Complete Package Unit for Outdoor Installations.





Load Tap Changing Transformers. Available in both standard and special designs in any Kva and voltage rating required.

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Power Transformers • Distribution Transformers • Step Voltage Regulators • Regulating Transformers • Load Tap Changing Transformers • Load Center Transformers • Unit Substations Network Transformers • Constant Current Transformers • Capacitors • Transformers for Electronics

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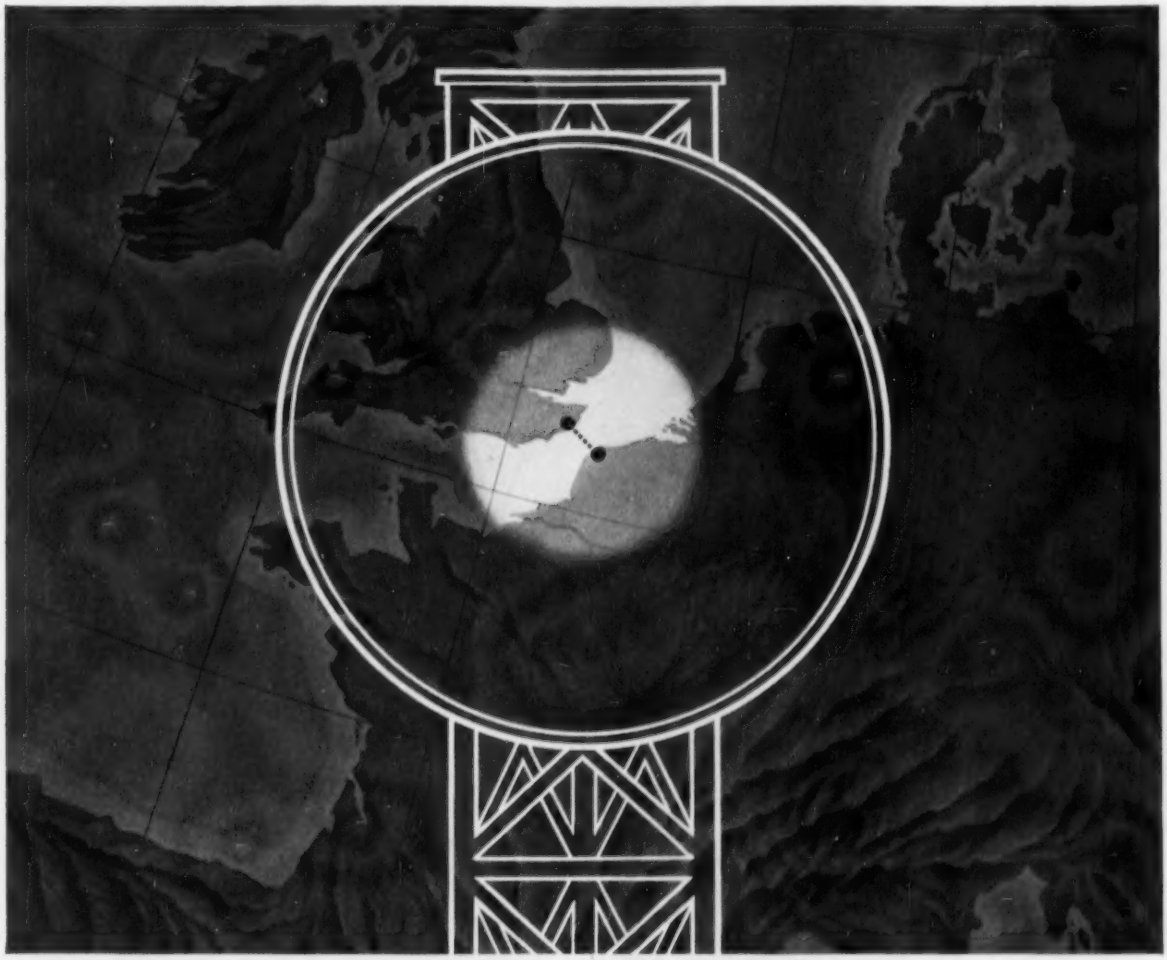

"Hello, Calais, this is Dover calling!"

Nearly a quarter of a century ago the world's *first* public demonstration of microwave communication took place across the English Channel, when scientists of International Telephone and Telegraph Corporation established telephone and teleprinter service between Calais, France, and Dover, England.

Out of this historic experiment IT&T developed the world's *first commercial microwave link* . . . the techniques and processes that resulted in one major "first" after another . . . in multichannel relay systems, television links, multiplex broadcasting, and diplexing.

Today, through *Federal* Microwave, private companies and administrations can draw upon IT&T's unique record in microwave pioneering . . . its still expanding pool of world-wide experience in research, engineering, manufacturing and system operation.

Federal can supply all microwave needs from under one roof . . . links and networks of any channel capacity . . . also associated telephone, carrier, and VHF mobile radio equipment . . . every facility for a complete, smooth-working system . . . *"Certified by a World of Research!"*

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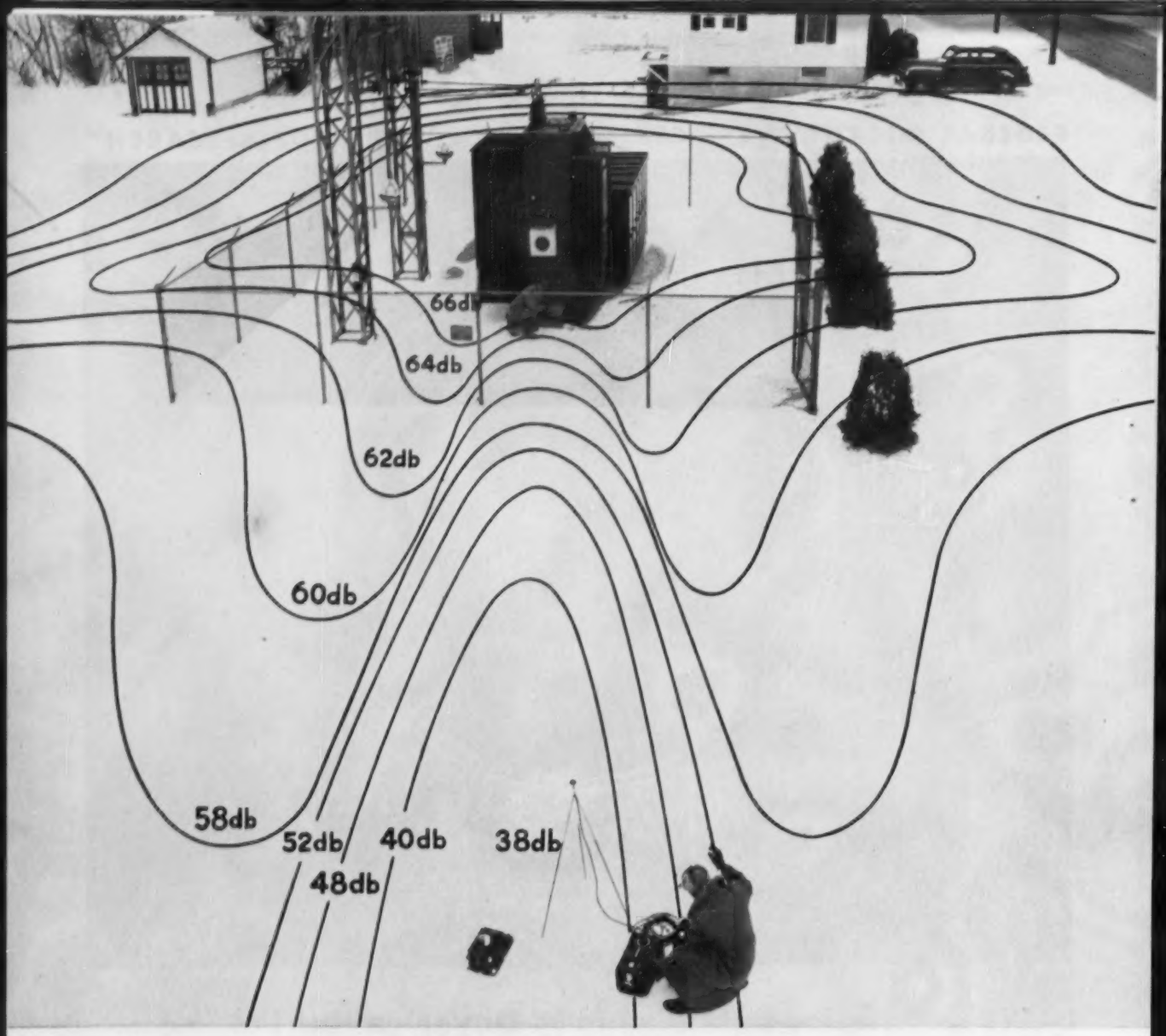
In Canada: Standard Telephones and Cables Mfg. Co. (Canada) Ltd., Montreal, P.Q.

Export Distributors: International Standard Electric Corp., 67 Broad St., New York



NOISE + NOISE = LESS NOISE

Sound cancellation—projecting a quiet zone through the complex sound field which surrounds a power transformer—may be an inexpensive solution to some transformer noise problems. Using loudspeakers and a relatively simple control circuit, G-E engineers have reduced transformer sound levels as much as 20 decibels within a 30° beam (noise energy reduced to 1/100 of its former value).

Here's how it works. A beam of sound with amplitude and major frequency characteristics identical to the transformer hum, ***but opposite in phase***, is aimed at the source of a complaint. These sound waves cancel each other... greatly reducing audible noise.

If you would like more detailed information on sound cancellation, ask your G-E Sales Engineer for a copy of a new technical bulletin, GET-2475. General Electric Co., Schenectady 5, New York. 421-30

Power Transformer NEWS

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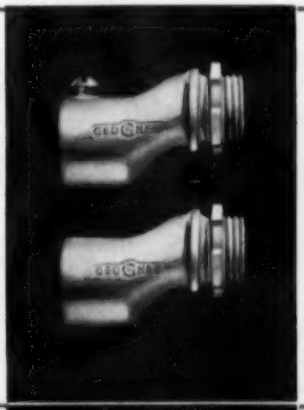
With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

FOR ROCK-BOTTOM INSTALLATION COSTS

SPECIFY GEDNEY!

GEDNEY FITTINGS are machined and threaded with utmost accuracy... smooth-finished, with no metal particles or burrs... made of malleable iron to eliminate breakage... individually inspected to ensure absolutely top quality. That's why they're quickest, least costly to install... Specify Gedney Fittings and you'll find, like thousands of others, that this is the most profitable line available today!

Gedney 90° Pull-In Ells and Adapters with Neoprene gasketed cover and self-retaining screws. These fittings may be used to convert a straight box connector into a 90° connector, or as a 90° box connector for rigid standard pipe coupling. Ells have female threads at both ends. Adapters have male threads at one end and female at the other. Made of malleable iron and cadmium plated. Sizes ½" to 2".



Gedney Offset Connectors—eliminate the necessity for offsetting conduit at knockout entrances of standard boxes. Threaded for rigid, set screw for EMT. Made of malleable iron, cadmium plated, in sizes from ½" to 2".

Gedney Corner Pull-In Elbows are outstanding for space saving, machine wiring, easy wire pulling. Malleable iron, cadmium plated. Made in ½", ¾", 1", 1¼", 1½" and 2" sizes.

Gedney Offset Coupling—female both ends—for use as an offset between boxes. Can also be used with conduit nipple (Gedney 7-50 series) to give more room in box than otherwise possible.
Gedney Offset Nipple, male both ends.

Both of these fittings are made of malleable iron, cadmium plated. Available in sizes from ½" to 2".

GEDNEY FITTINGS FIT

GEDNEY
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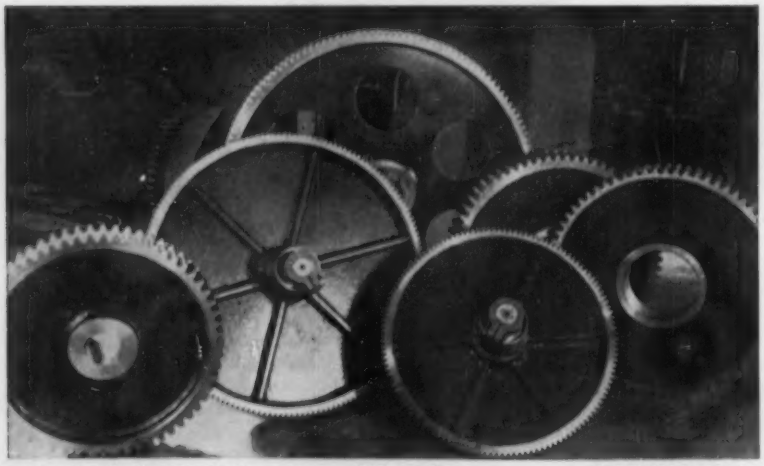

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Here you get tough gears with dead weight eliminated by welding forged one-piece alloy steel rims to heavy plate webs and forged hubs... long life assured by stress relieving and heat treating. Gear boxes made for perfect, life-time gear alignment. All sizes.

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17

BULLETINS ETC.

(38) ELECTRIC HEATING—A revised edition of the Electric Heating for Homes Guide, a handbook on electric heating, is now available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. Furnished free to those concerned with design and installation of electric heating systems. Ask for B-3768-B.

(39) ASSEMBLED BUSHING—Catalog numbers, ratings, dimensions and specifications for primary and secondary applications of Lapp dry-type bushings are carried in the company's bulletin 448. Write to Lapp Insulator Co., Le Roy, N. Y.

(40) CIRCUIT BREAKERS—I-T-E Circuit Breaker Co., Small Air Circuit Breaker Division, 1924 Hamilton St., Philadelphia 30, Pa., has published a "Speedfax" catalog that provides all essential information on the selection and application of molded case and large air circuit breakers. The 60-page catalog contains charts and tables to aid with selection.

(41) ENGINEERS' COUNCIL PAPERS—Four discussions on orientation and training in modern industry are now available in a publication of the proceedings of the 22nd annual meeting of the Engineers' Council for Professional Development. Write to the Council's Committee on Professional Development, 322 Baldwin Hall, Cincinnati 21, Ohio.

(42) TUNGSTEN — A brochure dealing with manufacture, properties and uses of Tungsten has been prepared by Sylvania Electrical Products Inc., 1740 Broadway, New York 19, N. Y. A colorful flow chart shows the range of products manufactured.

(43) SAFETY EQUIPMENT — Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa., is offering a booklet describing safety and rescue equipment for industrial plants. It is designated 5000-4.

(44) EQUIPMENT—A catalog of linemen's tools and accessories has been issued by Miller Equipment Co. Inc., Franklin, Pa.

(45) SAFETY SIGNS—Full color illustrations of more than 1,000 accident-prevention signs are included in a bulletin available from W. H. Brady Co., 727 W. Glendale Ave., Milwaukee 12, Wis. Ask for bulletin 145-C.

(46) TRANSFORMERS—A manual giving physical and electrical characteristics of liquid-filled, single- and three-phase transformers from 750 through 10,000 kva is available from R. E. Uptegraff Mfg. Co., Scottdale, Pa. It is bulletin 133.

(47) DEVICES—A 56-page catalog from Eagle Electric Mfg. Co., 23-10 Bridge Plaza S., Long Island City 1, N. Y., illustrates more than 1,400 electrical wiring devices, lamps and specialty products.

For more manufacturers' bulletins and coupon for use in securing them, see page 78.

QUALITY-CONTROLLED

SPANG® CONDUIT

. . . is easy to cut . . . is easy to bend . . . is easy to thread

. . . is easy to work with . . . saves you installation time

. . . saves you money . . . has high corrosion-resistance

. . . assures top-quality installations . . . offers years of dependable service in any type of installation

Take your choice of SPANG Hot Dipped Galvanized, SPANG Black or SPANGLEAM EMT. They're all *top-quality* products.

Your local SPANG Distributor carries the complete line of SPANG Conduit and fittings. He'll give you *top-quality* service, too.

Write for complete information and for the name of your nearest SPANG Distributor.

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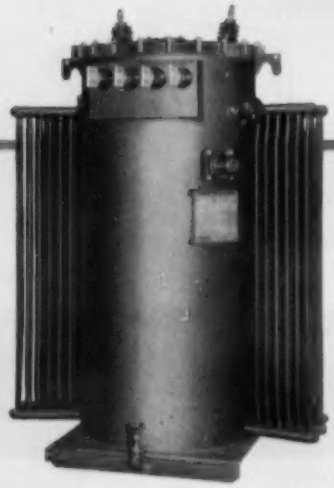
Wagner®
TRANSFORMERS
...the choice of leaders in industry

Here's why it pays to

Wagner Form W Distribution Transformers will meet *your* requirements. Full details are yours in Bulletin TU-180. Write for your copy today.



Form W Construction available in ratings up to 500 Kva

You can get Wagner Form W Transformers in a complete range of ratings, from 3 to 500 Kva, with protective features to meet your needs.

Wagner Electric Corporation
EST. 1891

choose Wagner Form W Transformers...

FORM W ELEMENT

Wagner Form W Transformers pay dividends in longer service life. The Form W element, with preformed cores of cold rolled, oriented grain steel, permits a liberal design in small size, lightweight transformers that give excellent electrical performance. And, whenever you buy a Wagner pole type Distribution Transformer, you get a transformer with many important *extra* features.

NEW HIGH VOLTAGE SIDEWALL BUSHING

This bushing, for use with either copper or aluminum conductor, permits FASTER connections —conductor is simply pushed into the connector and held tightly with a few turns of the knob ... EASIER connections—no tools are needed ... SAFER connections—insulated knob protects lineman when tightening the terminal.

INHIBITED OIL

You get extra years of service from Wagner distribution transformers because the Wagner 7NI oil used in these transformers reduces oxidation to a minimum and retards the formation of acids and sludge.

NEW LOCKED LOW VOLTAGE BUSHING

This secondary bushing is *key-locked* to prevent rotation. The terminal is locked to the porcelain, too, so it is impossible for the assembly to slip or turn when the terminal is being tightened or loosened. No more loose inner terminal connections to cause internal shorts.

SHUR-SEAL COVER

Wagner pole type transformers are sealed air-tight. The Shur-Seal cover is fitted with a clamping ring that firmly seals the cover to the tank. No atmospheric moisture or dust particles can get inside. Although this construction is as air tight as a welded tank, the cover may be removed by just loosening a single, stainless steel bolt.

T55-13

AND...THEY'RE SHIPPED IN DRUMS!

Wagner Type HEF and HEK Transformers from 3 to 10 Kva are now packed in sturdy fiber drums for ease of shipping, handling and storage. Each drum is sealed, so that when you open it, the transformer is free from dust and grease—as clean as it was the day it left the Wagner plant.

WAGNER ELECTRIC CORPORATION
6381 Plymouth Ave. • St. Louis 14, Mo., U.S.A.

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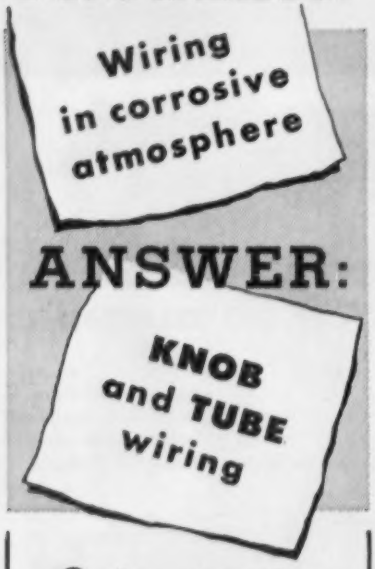
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 32 PRINCIPAL CITIES

Chicago contractor whips

PROBLEM:



Gets greater load capacity

A Chicago electrical contractor, installing the electrical system for a new hide-curing plant, was faced with a problem of high humidity and corrosive atmosphere. His solution—Knob and Tube wiring backed by the approval of a very safety conscious city inspection department. Knob and tube wiring is safer—easier to install and at lower cost—reduces maintenance—and will last indefinitely. Safely carries greater loads than any other method of wiring—from 33% to 100% more.

You can get all these qualities—and more—with Knob and Tube wiring. When you want the finest—for tough electrical wiring installations—specify Porcelain Products Knobs and Tubes. They're backed by over 60 years experience in the manufacture of electrical porcelain insulators. Contact your nearest jobber or write us direct.

MANUFACTURERS OF ELECTRICAL PORCELAIN SINCE 1894

61 years

PP —INC—

Porcelain Products, Inc.
FINDLAY, OHIO

BULLETINS

Starts on Page 74

(48) CAPACITORS FOR UTILITY SYSTEMS—Arranged to provide aid to users in selecting the best power capacitor for every application, this booklet matches various applications to the proper capacitor. Write Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. Ask for bulletin B-6136.

(49) ABSORPTION REFRIGERATING MACHINES—Large-capacity cooling from steam, no major moving parts and plain water as a refrigerant are features of absorption refrigerating machines described in a booklet now available from Carrier Corp., Syracuse, N.Y. Characteristics of 22 different models are charted.

(50) MEASUREMENT AND CONTROL — A new catalog illustrating and describing the Weston Inductronic System for Measurement and Control is now available from Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J. Technical information and application data on various control devices is carried.

(51) LIGHT AND POWER TIME SWITCHES—Available switches are listed and which type to use for specific light and power applications are shown in bulletin 155 published by Tork Clock Co., Mount Vernon, N. Y. The information contained is intended to help contractors to determine the best type of switch for any particular job.

(52) ALUMINUM CONDUCTORS—Recent developments in aluminum used for electrical conductor are described in Reynolds Metals "Technical Advisor" No. 28. Lead article is devoted to approved methods for joining aluminum wire, rod, bar, shapes and cable when used in electrical system. Request from Reynolds Metals Co., Box PR, 2500 S. Third St., Louisville 1, Ky.

(53) STARTERS—A new line of air-break electric starters for 2,200-5,000-v motors is described in folder 1060 from The Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland 4, Ohio. Starters using the manufacturer's type ZHA 50,000-kva air-break contactor are illustrated. For circuits of higher fault capability, these starters are built with current-limiting power fuses and in Valimitor style in which air-core reactors limit infinite kva to a finite value easily cleared by the 50,000-kva contactor, the manufacturer states.

(54) CONNECTORS—Bulletin 71 on a new line of electrical distribution and service connectors is offered by The Thomas & Betts Co., Elizabeth, N. J. Pages are loose-leaf.

(55) PULSE INSTRUMENTS—A general catalog on block unitized pulse instruments and brochures on model 2120A pulse generator and 2140A double pulse generator are available from Electro-Pulse Inc., 11811 Major St., Culver City, Calif.

(56) LIGHTING — Dealing with incandescent, accessory lighting equipment, bulletin F is available from Pittsburgh Reflector Co., 406 Oliver Bldg., Pittsburgh 22, Pa. It lists equipment for indirect, strip, interior spot and interior flood lighting and accessories for these applications.

(57) PRICE CATALOG—Electrical Specialty Co., 316 11th St., San Francisco 3, Calif., has prepared a 46-page catalog of products it distributes. Among the numerous products listed are wires and cables, insulation, tapes, sleeving, tubing, varnishes.

(58) GEAR—Rain suits and accessories for linemen are listed in catalog sheets from John E. Dorsey Co., 80 K St., Boston 27, Mass.

(59) LIGHTING FOR INDUSTRY—General engineering information and lighting solutions for specific industrial areas are carried in a 112-page handbook available from Holophane Co. Inc., 342 Madison Ave., New York 17, N. Y.

KILL TWO BIRDS WITH ONE STONE—Fill out this coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after August 1

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	

If described in advertising, fill in page number

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* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

a slow speed meter will live longer too!

In these fast-moving times, it's almost standard practice for doctors to warn busy executives to slacken their pace. Perhaps your doctor has advised you to slow down. If he did you probably took his advice because, well—we all want to live longer.

* * *

Slow-speed watthour meters will live longer too—because slow-speed means less wear on moving parts. This is why the Sangamo J2 Watthour Meter with its 6. constant will last longer than an ordinary meter with a 3.6 constant. The J2 is *the* slow-speed meter. There's less wear on all moving parts.

How much slower is the J2 than other meters? A full 40% slower. The J2 makes 111.1 *fewer* revolutions to measure 1 kilowatt hour.

THE FIRST WATTHOUR METER WITH

STRAIGHT LINE ACCURACY UP TO 100 AMPERES

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

JM55-5

ELECTRA'S HUSBAND

SHE made a brave counterattack, Mary Webber did, at an industry meeting last month. She's trying to save garden lighting for electricity against the reversion to the primitive flaming torch they're advertising now. About as much chance as getting women to give up candlelight for electric for eating purposes. Why, even the illuminating engineers are about to cry "uncle." At a recent meeting in Phoenix a final report of the Independent Committee for Research Into "Why Isn't the Home Well Lit, Whereas Its Occupants Sometimes Are" was presented. Listen—

"Your committee was assigned this problem of domestic illumination only because of desperate necessity. It has been observed of late that, despite the heartbreaking labors of illuminating engineers in domestic lighting, results have been in inverse ratio to the input.

"Our task force was given the mission to determine the obstacle and to remove it. It is true we have isolated the obstacle but it is we who are being removed—not she.

"We were instructed to spare no expense account and we didn't. We have used every means at our command—research, seizure, physics, antibiotics, nomenclature, foot-candles, philosophy, psychiatry and philandering—necessary, of course, but strictly in the interests of science.

"Beginning with fundamentals, of course, our first objective was this: It was necessary to find out what a *home* was—or *is*.

"It was at this point your committee found, as in many other aspects of illuminating engineering, nomenclature reared its ugly head. It wasn't a simple matter of whether to use footlamberts or helios. It was whether a home is a house or vice versa.

"Further research into this question led the committee to peruse with great interest, I may say, a recent documentary by a well-known housemother—sometimes known as madam—one Polly Adler. This treatise was titled, *A House Is not a Home*.

"From this reliable source certain characteristics of a *house* were ascertained. Among these were that the furnishings be florid, the walls and ceilings darkly colored and the lights be low—or out.

"It became our task, then, after thorough investigation of a *house* to see in what way a *home* differed.

"To our complete bafflement we could find the difference so minute as to be almost nonexistent. The only difference seemed to be this: that while both were occupied by women, those of the home were known as wives—and oddly enough as *house* wives—while the occupants of the other were known as—babes.

"This led to the hypothesis that perhaps the object of the former was to make the home more like the latter in order to keep the male member of the premises in the former and out of the latter.

A HOME IS NOT A HOUSE

"It soon became apparent that the history of home lighting and unlighting closely follows the style trend that is imitative of the home's attractive counter attractions or competitions—the salon—and what was once honestly known as the saloon in the more rugged days of the Old West.

"When Tom Edison brought forth the incandescent lamp it was the salon, the saloon, the theater and the casino and other houses that first used them to add gayety. From these it was taken into the home in clusters on the ceiling that made the living room look like the Chicago World's Fair.

"Soon after this brazen period, during which the sale of eyeglasses reached new highs, the porch light of the *house*, with its signal color, was toned down by the mistress of the *home* when she changed all the lamps to flame tints, evidently in an effort to keep the *home* fires burning, so to speak.

"Following the bright-lights era of living, light, you might say, went underground along with liquor. The era of the speakeasy was one of light lightly. Evidently light hid under a bushel was akin to a quart under the table. 'The better not to see you with,' the wolf said to Grandma, for how could he tell she wasn't a grandma in those deep shadows of the back bar.

"It was at that time women started going to bars, you old-timers may remember. In the old days a saloon was for men only and lights burned bright and gay.

"When women entered it was by the 'family entrance.' But speakeasies changed all that. Darkness concealed them from the Prohi squad and also hid *who* was in them. When the dry spell was over, saloons became elegant and dim. They became cocktail lounges. Even in daytime windows are curtained. As one authority has said, 'It has been years since a man could get lit in the light.'

"It may have been to relive a gay adventure of that era, some unexpected romance that sprang from gin and chance, half lit in some dark speakeasy that woman carried back to the home the same aura of mystery and deviltry. And to fill the air with the haze customary to a bar, she started to smoke like mad herself.

"Our study would indicate that in order to keep from seeing *what* she had married or to keep him from seeing what *he* had, she has adopted the deep shadows of Hernando's Hideaway. Who knows, it may also have been to match the color of the bags under the eyes.

"As a result, our statistics reveal, the *home* has almost run the saloon into second place. Why, it has even imported TV from the bars and serves free lunch and beer.

"Builders of homes, quick to omit anything that costs *them* money and that won't be noticed, now build houses for *homes*, presumably, without any fixtures. Those that are provided are contrived either to give no light or to drill holes in the dark with bullets.

"Hardly a trace was found by your committee of the daring pioneering by the eminent engineers of the society and by the utilities in the 30's. Only vestigial remnants and artifacts of a bygone civilization can be found here and there—an occasional IES study lamp in the home too poor to buy a new one, built over a tortured statuette or an old cuspidor. The prevailing trend can only be called Cathouse Moderne. But they sell, even if they don't light. In fact lighting is never done for its own sake. That would be too obvious."

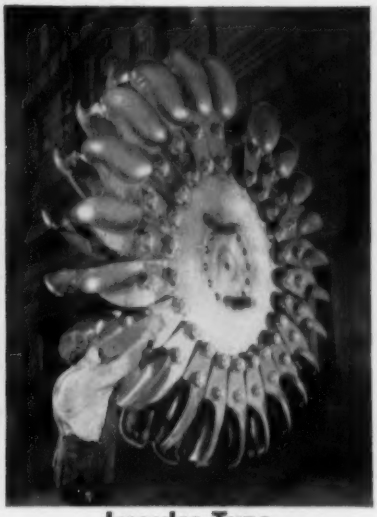
3 TYPES of Hydraulic Turbines

Propeller Type

Regularly chosen for low heads, up to 100 feet normally, and in exceptional cases even higher. Its higher speed effects appreciable savings in generator cost.

Francis Type

Used for heads up to 1000 feet — in some cases even higher heads — depending on the output capacity of the unit, the quality of operating water, and the character of load to be carried.



Impulse Type

For heads as high as pressure pipe lines can be built. Used for heads as low as 200 feet if water conditions prevent use of Francis type because of excessive wear.

ALLIS-CHALMERS Hydraulic TURBINES

Which is Best for Your Specific Needs?

ALLIS-CHALMERS WILL WORK WITH YOU and your consulting engineers to help decide. You'll take advantage of over 50 years' experience designing and building hydraulic turbines.

Besides building all three principal types of hydraulic turbines — Francis, propeller and impulse — Allis-Chalmers is in a unique position. It is the only company which can provide, in addition to the turbine, nearly all the other electrical equipment and auxiliaries needed. Generators, transformers, switchgear lead the list. The company can also provide pressure regulators, valves and governors for large units.

In many instances substantial savings can be realized by calling in Allis-Chalmers engineers to discuss the problem even before definite planning is begun. For all or any part of your needs, it will pay to contact the Allis-Chalmers representative nearest you. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, U. S. A.

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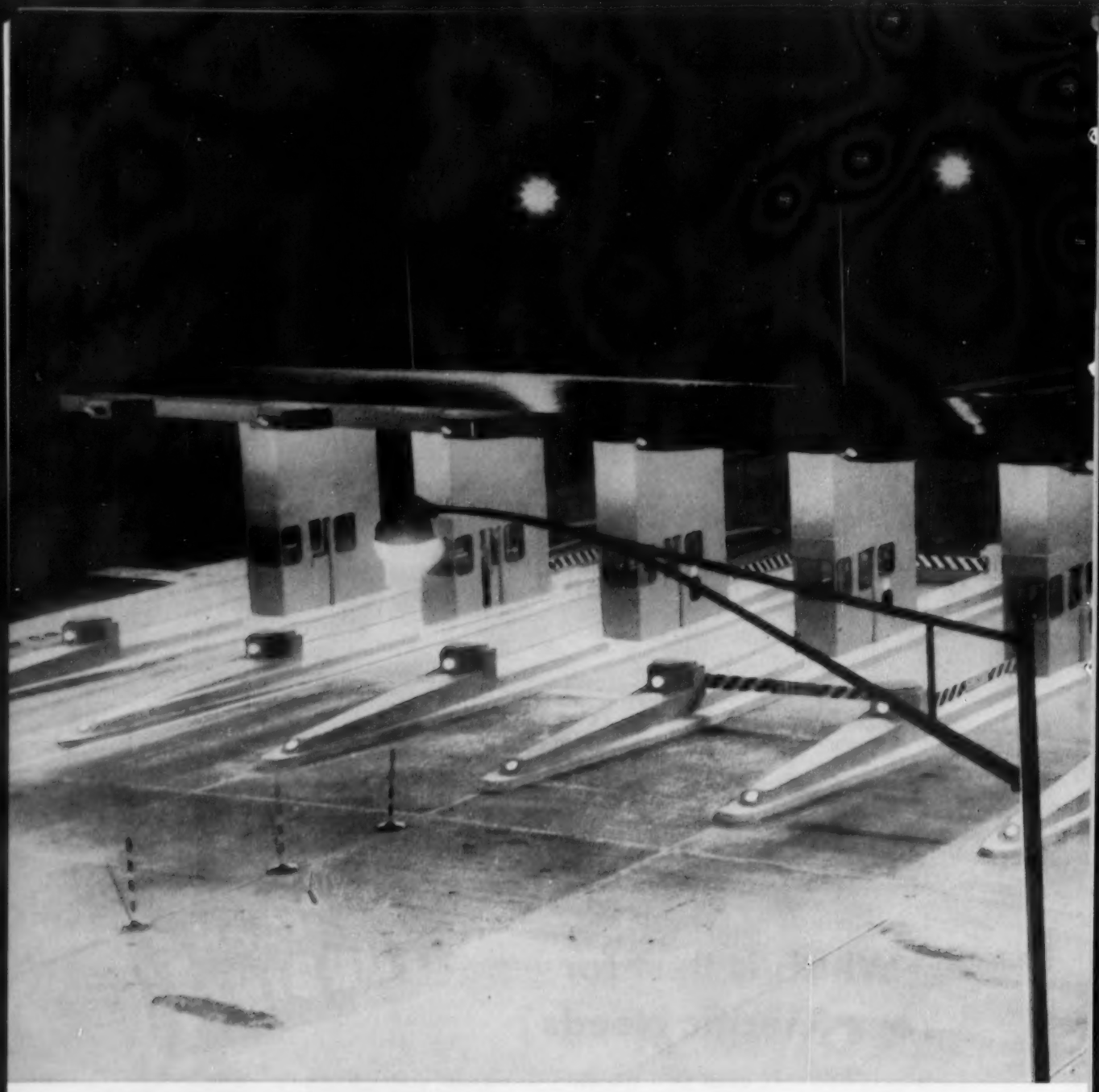
ALLIS-CHALMERS

Manufacturing Plants in United States and Canada

A-C ALLIS CHALMERS

Over 14½ million installed horsepower of hydraulic turbines throughout the world.



They're cutting the cost of superhighway

- Their light weight cuts installation costs
- They require no initial or maintenance painting
- They have high visibility for maximum safety
- There's a complete absence of seams and joints
- They're spun from aluminum alloy, heat treated for maximum structural strength
- They're designed to fit <u>your</u> individual requirements

One of the keys to safer superhighways is better lighting. And for every phase of turnpike lighting there's a HAPCO Standard to fit the job. HAPCO Poles are sturdy enough for the heaviest duty, yet maintain harmonious beauty with their surroundings. They retain a silver gray beauty, resistant to virtually all atmospheric conditions. Their long life without maintenance makes the investment in HAPCO Poles pay off in the long run.

Be sure to call your Hubbard representative for assistance in specifying street lighting standards, traffic signal pedestals, flood lighting standards, and related equipment. You can order Hubbard products through more than 200 leading electrical distributors throughout the United States.

lighting with HAPCO Aluminum Standards

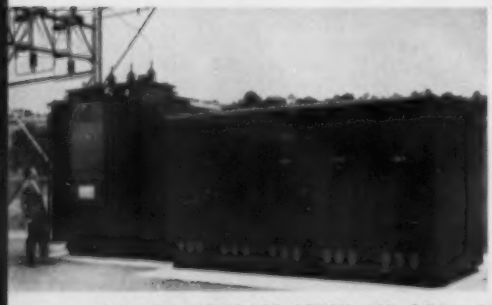
FREE HAPCO CATALOG. If you'd like more details on design features and specifications of the complete HAPCO line, write for this new free catalog. It contains valuable information to help you plan the most efficient, most beautiful highway and street lighting, as well as any other outdoor lighting requirement. Hubbard Aluminum Products Company, 6301 Butler Street, Pittsburgh 1, Pa.

HUBBARD ALUMINUM PRODUCTS COMPANY

Division of Hubbard & Company
Pittsburgh 1, Pa.

LANDSCAPING PLANS are reviewed for G.E.'s new booklet by E. M. Hunter (left), Electric Utility Engineer; J. C. Page (right), Manager—Product Planning for Medium Voltage Switchgear Dept.; and artist John Watrous. The booklet shows planting arrangements which allow utilities to accommodate residential areas with inconspicuous unit substations.

INTELLIGENT PLANTING OF SHRUBS which blend with those of the community can keep substations almost completely out of sight, helping to preserve local good will.



LOW AND COMPACT DESIGN with full-length transition between transformer and switchgear makes this G-E unit substation particularly easy to landscape.

Landscaping can help utilities...

MAKE SUBSTATIONS GOOD NEIGHBORS

. . . The economical way to good distribution and healthy public relations

Distribution losses can be whittled substantially and systems costs reduced when unit substations are installed closer to the residential load. But, this obvious step in improving distribution involves a ticklish public relations problem.

COMMUNITY APPROVAL NEEDED

By making substations more attractive, or at least less conspicuous, system planners find that the substation can be socially acceptable—allowing utilities to take advantage of proximity to load and improve local good will.

LANDSCAPING COSTS LITTLE

Landscaping substations is far less expensive than housing. Even the problem of concealing steel structures can be solved if towers are low and if terrain is graded up to substation fences and evergreens are planted at the top.

HOW TO DO IT

To help you to economically serve increasing residential load and meet community approval, General Electric engineers are keeping substation designs clean and functional. And, G.E. has prepared a new booklet which shows how landscaping may be done attractively and at minimum cost.

To get your copy write for GED-2403 to the General Electric Company, Section 301-291, Schenectady 5, N. Y.

MORE POWER TO AMERICA

GENERAL ELECTRIC

ELECTRICAL WEST SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S. VOL. 114 NO. 6 JUNE 1955

"The tremendous advances made by our industry are directly related to nation-wide technological progress . . . We have a big stake in automation's future."

Roy N. Dreiman, President
Pacific Coast Electrical Assn.

In the Dynamic Electrical Industry We Can Achieve

PROGRESS THROUGH TEAMWORK

Roy N. Dreiman

TEAMWORK is the guiding principle upon which our association relies—its members working together to prepare for sound, strong growth in the electrical industry. By combining our knowledge, one member's experience is added to that of others. The ideas of one become the assets of all; we teach as well as learn. The manufacturers, the wholesalers, the contractors, the dealers, the utilities—in fact, everyone in the electrical industry—are cooperating to insure its continued success.

Through teamwork the expansion of existing business and industry is being promoted, and new industries and enterprises are being attracted. We are utilizing the most effective means of education to bring about a more complete use of electricity for the mutual benefit of our customers and the electrical industry as a whole.

Indications are that the 1955 sales and production levels of our economy will rise above 1954. The electrical industry confidently expects to share in this prosperity and has laid plans to meet the anticipated upsurge in demand. However, we recognize that we have shifted from a seller's to a buyer's market. We can only attain our full potential by successfully meeting the most rugged competition for the consumer's dollar. To meet this challenge, good creative selling will be necessary and strong aggressive sales programs have been instituted throughout the entire electrical industry.

At the same time, we must and will continue to render good and efficient service to our customers. Facilities are being properly maintained and expanded as needed, new and more efficient machinery and equipment are being designed and economies are being effected wherever possible. This all means that our customers will continue to enjoy bargain prices for electricity. Every segment of the electrical industry is playing a vital part in this essential program. We stand ready, willing and able to provide the facilities required to produce and deliver the anticipated increase in electrical load which our customers will require.

However, there is a dark cloud on the horizon which is becoming increasingly menacing to this otherwise rosy outlook. The lack of adequate wiring on the premises of customers is a serious bottleneck to the further progress of the electrical industry. This is particularly true among residential customers. Less than 5% of the homes in existence today, including those recently built, are wired to permit the families living in them to enjoy fully all the advantages which the electrical industry has to offer. Consequently, the customer suffers and every branch of the industry is restricted in developing the maximum amount of potential business.

The appearance of such devices as air conditioning, 18-kw ranges, 9-kw water heaters, 8.5-kw dryers, as well as the rapidly increasing number of electrical appliances available for sale and use, make this problem a critical one today. The public has not only accepted these appliances, it is demanding them as necessities of modern living standards. We are lagging behind this public demand because of our inability to serve their needs satisfactorily over the inadequate wiring which prevails. It is, therefore, vitally important that our industry generally and collectively make a concentrated effort to break this bottleneck.

Some good work has been done in the past in this direction; however, the time has come when our efforts must be

"We must all work at the wiring problem with constructive, intelligent teamwork."

greatly multiplied to make certain that there is an adequate pathway within the homes, schools, offices, stores and factories of our customers through which our full service may enter. We must do more than talk about it; we must all work at the wiring problem with the same constructive, intelligent teamwork with which we have solved other difficulties that have tended to retard the progress of our industry in the past.

We are already in the electronic age and are on the threshold of the atomic age. The work force of the nation is being tremendously influenced by changed work assignments, improved methods and new machinery and equipment.

Along with the advent of electronics has come increased automatic control and instrumentation in factories and offices. Automation is becoming prevalent in every phase of industry. Automation—feared by a few but recognized by most as the greatest single source of man's welfare. Automation—a new word describing certain mechanical controls and processes.

There is nothing new about the mechanical principle to which automation applies. Mechanization has enlarged the output and purchasing power of our people. As the volume of production has increased, it has taken more workers to sell and handle these goods. Our advance in technology has created whole new industries and vast new fields of opportunity. The facts show that only through the widest possible use of new and better machines can we hope to achieve the fullest measure of employment and a higher standard of living. Dislocations of personnel which do occur in some industries have and can continue to be taken care of through the over-all increase in jobs. This is borne out by the fact that during the past 15 years while the population increased 22% the number of jobs increased 37%. Many of the jobs are now at a higher level requiring human judgments and greater skills.

The tremendous advances made by our industry are directly related to nation-wide technological progress. Equipment and machinery manufacturers use large quantities of electricity in their production; the factories and other customers use even greater volumes in their operation; and the electric utilities have been in the forefront in applying automation to their own operations. Indeed, we have a big stake in the future of automation.

Now, let's take a brief look at government ownership of utilities. Is there any justification or need for the government to continue the building of power projects? Obviously, the answer is emphatically no.

The investor-owned electric power companies should be permitted to perform those jobs which they are willing and able to do. America's electric light and power industry will continue to provide plenty of electricity for home, farm, and industry. Federal and state regulatory bodies will insure that the rates charged their customers are fair and reasonable.

Construction of electric production, transmission and distribution facilities by investor-owned utilities would relieve the government of the necessity for making the large expenditures involved. Federal, state and local governments would receive approximately one-fourth of every dollar of revenue collected by the utilities in the form of taxes. By contrast, the government-owned utilities are unfairly favored with almost complete tax exemption.

That's why there is no need for the government to increase the public debt by building more unnecessary power projects. On the contrary, it would be in the public interest were they to sell their existing electric properties. This would substantially reduce the public debt and at the same time eliminate the present inequitable imposition of taxes by placing these government-owned businesses on the rolls of the various taxing agencies.

The President, in his fiscal 1956 budget message to the Congress, again set forth the partnership principle of development of resources which the administration believes to be best suited for the continued economic progress and security of the nation. This is an invitation for more teamwork.

The electrical industry is sounder today than ever before. It is fast-growing, vigorous and strong in all of its segments and is making a great contribution toward America's dynamic growing economy.

Teamwork—working together as an industry, thinking together as an industry, learning together as an industry and selling together as an industry. That, in brief, is a picture today of the electrical industry in action.

Effective Landscaping

Hawaiian Electric Co. in Honolulu has a good-neighbor program that includes keeping its residential district substations as attractive as possible. Substations like the one shown are protected from street view by a garden wall with wooden gates. Transformers and cubicles are painted an attractive green and suitable shrubbery is planted. Watering is done with an automatic sprinkler system operated by time clock.

Hawaiian Electric feels that it should be a good neighbor and not one who lets the weeds grow in his backyard and lets his place run down and depreciate values in the area.

"Pacific Northwest power situation is only one phase of a much greater problem of resource development. Water, not power, is a basic consideration."

R. C. Setterstrom, President
Northwest Electric Light & Power Assn.

The Partnership Philosophy Permits

A NEW LOOK AT NORTHWEST POWER

R. C. Setterstrom

"CHEAP power" has been a magic phrase in the Northwest for about a century. Electrical living and industrial development has been predicated on it. The great copper and zinc industry in my own state of Montana was built on cheap electricity. Hoisting ore by steam power in Butte cost $130 per horsepower year. Hydroelectric power was brought to Butte from Great Falls in 1910 to reduce the cost to $30 per horsepower year making mile-deep mining economical.

About a quarter century ago this same magic phrase of "cheap power" was discovered as a great political slogan. Under its spell basic purposes of the Bureau of Reclamation to reclaim waste land were somewhat forgotten and the generation and transmission of power became very important. Power became so dominant in the Northwest that the Bonneville Power Administration was established as a marketing agency for the power from both the Corps of Engineers and the Bureau of Reclamation projects in the Northwest.

I wish to make it clear that I have no quarrel with the thousands of good men and women in the federal agencies. These people are just like us with a desire to make a living at their jobs so they can raise their families, provide a measure of future security and enjoy the fruits of life. I have scores of personal friends in perhaps every agency dealing with our natural resources.

The Eisenhower administration, through Secretary Douglas McKay, has proposed a sensible, workable partnership program of power development. I am firmly convinced that this partnership program is the only sensible solution for assuring adequate power in the Northwest. I am not going to try to prove my convictions with a lot of statistics. They may sound very convincing now, but history generally proves them wrong. Rather I shall give some general observations upon which I base my convictions.

First, the population of the U. S. is increasing at a terrific rate and the forecasters are continually changing their estimates upward. The latest is 220,000,000 by 1975. Second, more and more industry and people will discover the advantages of our great Northwest and it is anticipated that our population rise will greatly exceed the national average. Third, electrical living will increase at a phenomenal rate and this coupled with industrial development will require an almost staggering growth of the electrical load. Fourth, the private power companies have always operated on a basis of adequate power at all times for their customers.

It requires several years to study, plan, design and build hydroelectric projects. It takes additional years to go through the routine required to secure appropriations for federal projects except in extreme emergencies such as war. Federal expenses due to wars have increased so prodigiously that it is becoming increasingly difficult to secure funds for the development of a small area at the expense of the country as a whole.

Partnership Program Is Solution

By combining these various factors, it becomes evident that it is very unlikely that adequate federal funds will be forthcoming to build power projects at a sufficient rate to meet the demands of the probable load increase. The obvious solution is the administration's partnership program. An orderly development of this sound partnership program is being hampered by those who attempt to make political "hay" by labeling it a "give-away" of natural resources.

I am not surprised at the large and vocal opposition to the program. The public has had more than 20 years of tremendous federal power development. Most of these 20 years have been good years financially for most people due to war and other conditions. Even good weather and large crops have favored the farm people which seems to be historically true for war years. A tremendous public power publicity campaign has kept the issue before the people in a favorable light.

During these same 20 years the private power companies of the Northwest have been harassed by tax-free federal

competition while their own taxes were climbing astronomically. They have been opposed by minority groups on hydroelectric developments. They have had to fight repeated attempts of public power bodies to buy or dismember their systems through referendums. They even had to ward off attempts by their own holding company to sell them to public power bodies.

It is said that adversity builds character. The fact that the private power companies of the Northwest are strong, fast-growing organizations today bears out this statement. To me, it proves two things: first, the public wants private power to serve them and, second, the men of vision who are guiding the destinies of these companies had the intestinal fortitude to fight because they know that private power must succeed if we are to continue as a free enterprise nation where we all enjoy greater individual liberty than any people on earth. I would like to pay tribute to all of these great leaders who have so valiantly fought our battles for so many years.

At a Northwest Electric Light & Power Assn. meeting in Spokane last month one of these great leaders, Kinsey Robinson, president of the Washington Water Power Co., gave a real soul-stirring talk. He stressed the grave necessity for every private power company to provide its own power generation because under the "preference clause" we would eventually lose any government power to the rapidly growing load demands of preference customers. The thought expressed by Robinson is not idle talk because the revitalized and optimistic private power companies are embarking upon the most comprehensive development program in their history.

Proposed Developments

The Pacific Northwest Power Co. has been formed by the Pacific Power & Light, Portland General Electric, Washington Water Power and Montana Power companies for the purpose of investigating and considering the building of several power projects including Bruces Eddy on the Clearwater and Mountain Sheep and Pleasant Valley on the Snake River. Washington Water Power is now considering Noxon Rapids near the Montana-Idaho border on the Clarks Fork. Montana Power is investigating three sites below its Kerr project on the Flathead River. Portland General Electric has been trying to build the Pelton project but has encountered a conflict with fishing interests. All are familiar with the Idaho Power Co.'s plan to build the Oxbow, Brownlee and Hells Canyon projects on the Snake River.

The foregoing are some of the projects proposed for outright construction by private power. In addition, private companies have signified their intention to participate in the partnership program. Montana Power and Pacific Power have indicated their willingness to consider a partnership deal on the Yellowtail project on the Big Horn River in Montana. Pacific Power & Light, Portland General Electric and Washington Water Power have indicated their willingness to advance up to $273,000,000 as prepaid revenue to help build the John Day Dam on the Columbia with the balance of its cost of $37,000,000 to be paid by the federal government for the navigation and other nonreimbursable benefits.

The city of Eugene proposed to install the power facilities at Cougar Dam, a Corps of Engineers project on the McKenzie River in western Oregon. The plan was agreed to by all the federal agencies involved, but when enabling legislation was submitted to the Senate, the public-power senators—including Oregon's own Wayne Morse—sharply attacked the plan on the grounds that it would create a "dangerous precedent" under which private power companies might receive equal consideration.

Here was a case where a public-power agency sought to take advantage of the partnership program but was dumped because private enterprise might do the same thing somewhere else. It was a clear indication that the public-power lobby is determined that no one but the federal government shall develop electric power.

These Policies Fundamental

I would now like to say something as a rancher. My only home now is on a small 400-acre ranch near Butte. I was particularly happy to read the following, which is from President Eisenhower's state of the union message to Congress:

"At the foundation of our economic growth are the raw materials and energy produced from our minerals and fuels, lands and forests, and water resources. With respect to them, I believe that the nation must adhere to three fundamental policies:

"First, to develop, wisely use and conserve basic resources from generation to generation;

"Second, to follow the historic pattern of developing these resources primarily by private citizens under fair provisions of law, including restraints for proper conservation;

"Third, to treat resources development as a partnership undertaking—a partnership in which the participation of private citizens and state and local governments is as necessary as federal participation."

I am happy to say that I am giving of my personal time to help carry out these three fundamental policies through my service as a supervisor of a soil conservation district. More than 13,000 farmers have been elected by their farmer neighbors to carry out a partnership program of soil and water conservation now covering more than 90% of the land area of the United States. In our Mile High Soil Conservation District we have five supervisors who serve without pay to promote actively and direct a program designed ultimately to attain wise use and consequently conservation of every acre in our district. The federally employed soil conservation technicians who furnish the technical assistance to the farmers of the district work under our direction. The farmers who sign up to receive this assistance are called cooperators, but they are not bound or required in any manner to follow the recommendations of the SCS technicians. It is a truly democratic way to accomplish a very important job on a federal-local partnership basis.

Why bring soil conservation districts into this discussion of power? The answer is water. The use of water has

"It is said that adversity builds character. The fact that the private power companies of the Northwest are strong, fast-growing organizations today bears out this statement."

increased 400% since 1900. This is due to doubling the population and doubling the water use per capita. It is said that "water, like money, is evil if you have too much or too little of it." You have all read many accounts in recent years of water shortages in many places throughout the United States. Californians have even been accused of scheming to divert Columbia River for their use. You also read periodically about severe floods with the attendant loss of life and property.

I sincerely feel that the time has come when we must more effectively coordinate our efforts toward the end of protecting our water supplies for human consumption, food production and industrial use. The Governors' Power Policy Committee formed by the governors of Montana, Idaho, Washington and Oregon is working as a fact-finding group in order to evaluate problems arising from hydroelectric development on a broader basis. Population growth will bring added pressures on the use of available water. Add on the problems already developing relative to allocation of water between Canada and the United States on streams and rivers flowing through both countries and I believe that water and not power will soon become the real problem. Fortunately we can generate power by fuel resources and perhaps atomic power may develop faster than we now expect.

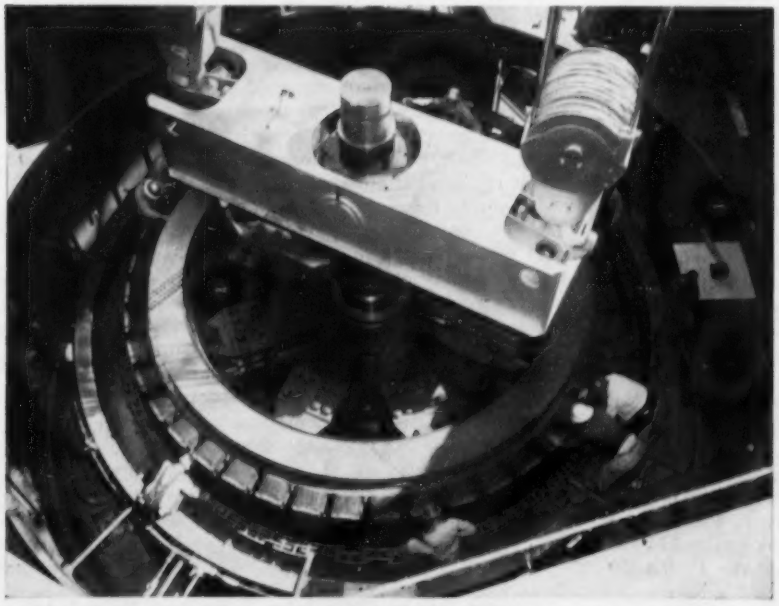
More Investigation Needed

Montana is the headwaters of two great rivers, the Columbia and the Missouri. I might even claim the small stream on my ranch located two miles from the Continental Divide as the beginning of the Columbia River. When I took over this run-down ranch, the water ran off in a torrent each spring when the snow melted and also after each heavy rain. By building up good grass cover plus three small dams, the runoff has been reduced very materially. I keep the water for my benefit now. Thousands of farmers are doing the same thing to conserve water. As we approach a complete soil conservation goal, and build thousands of small dams to hold runoff, I believe that the downstream flood pattern will be altered more than many are willing to recognize now. I do not advocate stopping construction of downstream flood control dams, but I believe the effects of this on-the-land conservation work is worthy of more investigation. This is being encouraged under the small watershed projects act and we have in our Mile High district one of the first projects to be approved for investigation by the Soil Conservation Service.

Logical Approach

It has been my experience that my viewpoints on fundamental consideration do not differ materially from those of perhaps 95% of the people I meet in all walks of life. I believe that greater effort should be made to reach areas of agreement with this 95% group on issues of great concern to all of us. In this case the issue of great concern is the use and handling of our water resources. I am quite sure that if this would be done that it would be very evident to this group representing 95% of the people that President Eisenhower's proposal to develop our resources by local groups when possible and through federal partnership with local groups when necessary is the logical and sensible approach and in their best interests. Unless we take the leadership to accomplish this objective, then we may expect the group representing perhaps 5% of the people to shout loud and long about the relatively minor areas of disagreement until many of the 95% group will consider them to be of magnified importance. A good little thought to remember is that "people are down on what they are not up on."

The power situation in the Northwest is only one phase of a much greater problem of resource development. If I were charged with the responsibility of working on this over-all problem, I would be inclined to pray for guidance. In my own words, it might be something like this: *Oh God, in Thy infinite wisdom, guide us in the development and wise use of the abundant resources Thou hast bestowed upon us that they may be protected and conserved for future generations to enjoy a bountiful life under a government where individual freedom and human dignity are paramount.*



Lowering immense rotor for one of the three 54,000-kw generators at Folsom power plant

Folsom Near Completion

Interest heightens in the Folsom flood control, irrigation and power project located on the American River at the town of Folsom, Calif., as the development nears completion. The 340-ft concrete and earth-fill dam, 1,400 ft in length, will create a water storage of 1,000,000 acre-ft and provide a net operating head of 300 ft for the power plant located at the foot of the dam.

Three 54,000-kw generators driven by 74,000-hp turbines are being installed. The power plant is of the semi-outdoor type.

The dam is being built by the Army Engineers and the power plant by the Bureau of Reclamation. The project as a whole will be operated by USBR as a part of the Central Valley Project. Power will be fed into the CVP system through a 20-mile, 230-kv transmission line from Folsom to Elverta substation.

"It is not accidental that industrial development takes place near the universities that can supply the trained men and are strong in research."

Dean Frederick E. Terman
School of Engineering
Stanford University

Electronic Age Analysis Shows That

FROM CLASSROOMS COMES PROGRESS

Dean Frederick E. Terman*

THE United States is in a period of changing conditions with regard to engineering manpower.

In reviewing the situation, it can be seen that engineers are in short supply.

Before World War II, engineers were turned out at a fairly steady rate that was gradually increasing. In 1929 about 10,000 bachelor's degrees were granted, plus a small number of advanced degrees. At that time there was a slight shortage in the supply, but nothing too serious.

The trend continued upward over the years and by 1942 there were 15,000 engineers graduated with bachelor's degrees, with still not very many advanced degrees.

During the depression years there was a surplus of engineers, but by 1941 engineers were beginning to be needed again and there were an adequate number of jobs but no shortage of engineers.

After World War II the situation changed. A great wave of students entered college to take engineering; this represented the normal numbers coming out of high school plus all the stored-up GI group who were able to go to college with government subsidy. The peak of that wave was in 1950 when 53,000 engineers were graduated with bachelor's degrees. This is something like three and a half times the 1942 figure, which had been a peak up to then.

Another change also took place after the war. A great deal of interest was shown in graduate work, so that along with 53,000 bachelor's degrees some 5,000 master's degrees and about 400 doctor's degrees were awarded.

Even this large number of engineers wasn't enough. By 1950 the nation was just beginning to catch up from the accumulated shortages after the war and then the Korean war came and created further demand.

In 1954 there were 22,000 engineers graduated. In addition, about 4,000 master's degrees and 600 doctor's degrees were awarded. The 22,000 was only about 40% of the 1950 peak and was just about the number that would have been turned out in 1954 if one projected the 1920-1940 trend line.

As far as the future is concerned, it is fairly easy to predict that there will be a moderate increase in the number of engineers graduating in the next few years and a rise in the percentage earning advanced degrees.

The basic supply of engineers, i.e., those with bachelor's degrees, will be somewhat larger because there are more engineers in the freshman, sophomore and junior years in colleges today than in last year's senior class.

However, there is not going to be any really big increase in the supply of engineering graduates until about 1965, when the babies born at the beginning of the war will begin to reach college graduation age. In the meantime the population and industry will have grown to the point where most of these additional engineers will be needed to keep pace with normal industrial growth, without catching up on any shortage.

So with our present supply of engineers inadequate and no great new additions expected for a long time, I think you had just as well accept the fact that this shortage of supply is going to be a more or less permanent thing for quite a while, provided our national economy operates on about the present basis.

However, these statistics do not tell all of the story. They do not even bear directly on the most important part of the future manpower problem. This is because today so many of our engineering activities operate at a far higher scientific and technological level than ever before.

Steadily increasing demands are being made on the knowledge of the engineer and he must have more technical and scientific background in order to understand and cope with modern problems successfully than was required before 1942. Thus the servomechanisms and automatic control systems that have evolved in the last 15 years require a lot more understanding and a lot more analytical ability to design than the regulators of 25 years ago.

Again, it is going to require a lot more science and engi-

* Extracted from an address before Pacific Coast Electrical Assn., May 12, San Francisco.

neering to build and operate a nuclear-powered generating plant than it does to build and operate an equivalent steam plant.

Today we are dealing with a much more complex technology, one that has its roots much more deeply in the science that backs up all engineering. And today, unlike the past, we are expending a great deal of effort in an attempt to do things, particularly in the interests of national defense, that we are not even sure that we can do. We are trying very hard to do these things, however, and as a nation we are willing to spend lots of money just to find out if we can do them. There is plenty of money available for work on such problems and money is not the factor that determines whether or not a particular problem gets solved. Neither are the number of graduate engineers available to be assigned the job when one counts the number of engineers by the bodies that they represent. It is the brain power with the superior training that makes the difference.

The engineers either have the combination of talent and training required to solve the problem or they do not; it takes people possessing really great depth of understanding to get a usable solution to many of today's problems.

Whether or not such problems are solved is determined by the quality of people that are put on the job and the training that they have and the extent to which the training enables these people to utilize their native abilities to the very limit of their possibilities.

This means that advanced training, often to the doctor's degree, is increasingly important now, and will be even more important in the future manpower situation. A four-year training provides little more than a springboard from which to start. It represents a general background in engineering plus less than one year of specialization in a particular field, like electrical engineering or mechanical engineering. In many fields, today's more important problems cannot be solved with a background that is so limited.

More knowledge is needed. The knowledge required is the kind acquired by going to college for at least one or two years beyond the B.S. degree to get a master's degree, time during which the student can devote full time to a particular field of specialization so that the total amount of specialization he has acquired is doubled. Or in many cases, a doctor's degree is needed; this represents four or five years of additional training in a specialized, definite direction and puts the ceiling of an able man incomparably higher than does a B.S. training.

Training Advances With Technology

Many of the problems that are coming up now and in the future are such that on-the-job training is not sufficient and in some cases is not even possible. There are certain types of things that cannot be learned on the job. For example, many advanced but practical problems in fluid flow, electromagnetic fields or a network synthesis requires the use of the concepts of the theory of functions of a complex variable to solve, and this knowledge is going to be acquired only in a classroom.

Also, many new areas of the technology are advancing so rapidly that there is no way to get on-the-job training because there is no one already on the job who knows much about the new field. What must be done in such situations is to go to the research laboratories either in the universities or in industry, and get the research men who are creating the new technology that is involved to do the engineering. This is necessary because they are the only ones that have the knowledge required to solve the critical problems in such a field.

To meet this situation, there is evolving a new type of corporation, or new type of activity within some of the existing corporations, involving the establishment of groups to operate at a higher technological level than has in the past been customary in an industrial organization. Such groups concentrate exclusively on problems that are too difficult for a standard type of organization to solve.

One example is a company in southern California that had maybe 50 employees at the end of the war but now has in its research and development division something around 4,000 employees, nearly half of whom are engineers and scientists. This company undertakes only the difficult-to-do jobs; the kind that most companies have great difficulty solving. It is one of the great research laboratories in the country; over 30% of the total engineering and scientific personnel of its research and development division have advanced degrees; nearly 10% have doctor's degrees. Moreover, at the present time they are sending something like 150 or 200 engineers to college at company expense in order to get master's degrees.

Price for Know-How Goes Up

Along with more training there is an interesting development in regard to salaries for these technical people. Some companies now have salary scales for people doing strictly scientific engineering, with minimum administrative responsibility, that are comparable with the salary scales for the executives above them in the table of organization. Salary is no longer necessarily dependent on the number of men one supervises, but is sometimes based on the ability of the engineer to solve the technical problems upon which the success or failure of the project depend.

The economic value of people with superior training and talent is going up. For instance, the cheapest way to develop a new guided missile is to go to an organization that is heavily loaded with scientific research people of outstanding talent and training and let them solve the problem, even though this involves the lavish use of men who draw mighty high salaries. The difference between this organization and one with only a few people who have had the proper training is that the first will actually produce the solution, the second may not even after spending a hundred million dollars.

The Western United States is coming to its own with respect to the engineering manpower situation. Before World War II there were few very good opportunities in the West. Young people in electrical engineering with advanced training tended to go east where the most challenging opportunities existed.

Now this situation is no longer true. Population has grown in the West, industry and manufacturing have expanded and the technological level of activities in the West has been raised. As a result, the West, and particularly California, has been rapidly becoming a center for creative work and research of various types.

California now offers challenging opportunities at all levels of design, production, manufacturing, research and other scientific work to young engineers and scientists coming out of California schools. With good living conditions and comparable salaries, too, the state is able to hold most of its own graduates, who went to the East in times past. In fact, it now attracts many young engineers from the East. The manpower situation in the West is hence better than the rest of the country and will so continue, to the advantage of Western industry.

I think the future is very bright for engineering in the West. The present situation looks as though it is stable; it is built on a sound foundation of creative research and for-

ward-looking attitude; it is vigorous and it has gotten into the newer things that are going to expand and develop.

Research is vitally important to the industrial future of the West. To illustrate its importance, consider the case of the Chicago area, which was the nation's leading producer of electronics equipment before World War II. Industry there had lots of practical know-how on how to get out production but both the industry and the universities of the area were short on research.

When microwaves and their new possibilities entered the picture in 1940 and 1941, an electronics revolution started. The new field of electronics had to come out of the research laboratories, which in turn meant, at that time, from the East rather than the Middle West.

The eastern laboratories were soon overloaded, but since the Middle West was geared only for production and not research and advanced development they lost their leadership; as a result an opportunity opened up in the West.

It is not accidental that the most advanced types of industrial development tend to take place near universities that can supply trained men and which are strong in research. Such universities are a source of ideas and they are a great source of stimulation for creative work.

There is a cause-and-effect relationship in this situation. The universities help you and you help them, and can help them more. This isn't limited just to hiring our graduates but rather also means cherishing and supporting these universities in ways that will make them stronger in the future in order to better serve you and the young people of the West.

We've Found a Way to

MEASURE WIRING PROMOTION RESULTS

Carleton J. Bunce

HOW does one measure the results of an intangible? As far back as the original date of organization in December 1951, the Electrical Contractors' Division—San Diego Bureau of Home Appliances has been constantly alert to the need for developing some basis for measuring a promotional program such as it has.

Specific effort was directed toward the distributors in San Diego and also the manufacturers represented locally in the hope that they could help develop some yardstick that would give us the answer to our problem. We could gain no logical or positive response from them because of the impossible situation regarding supply and demand and accounting.

Our decision then directed us to investigate the possibilities of securing the information we wanted from the electrical contractors. In our initial planning we hesitated to ask questions other than those that required a stock answer. A form was created. On it were placed a number of divisions so various service entrance sizes could be tabulated along with panels, general circuiting, special circuiting, device installation and wiring, heater types and the number installed, lighting fixture allowances and low-voltage control.

With the tabulation form in order, I started making personal contacts with electrical contractors. It was not intended to select any particular contractor but rather to cover the various areas within San Diego County and the contractors' operations therein. Such towns as Chula Vista, Fallbrook, Escondido and San Diego were included.

From the very first approach, the electrical contractors reacted in the most favorable manner. When they fully understood the reasons and need for gathering the data, they gave me a complete breakdown of the residential jobs they had installed in 1954. They were enthusiastic when given the opportunity of having their data included in a report. A spark seemed to be ignited.

As a consequence, it was possible to add question segments to the original form and thereby make the survey a more productive analysis of the residential construction work completed in 1954—electrically.

Some contractors invited me to inspect their records, which usually is not done. This lent considerably to the authenticity of the facts and figures incorporated in this report. A further check of the information gathered was made by contacts with local distributors to insure correctness.

The following figures represent basically the individually constructed homes and not those in any large tract (100 homes or more). Only three of the contractors questioned were engaged in wiring homes in small tracts.

Service entrance equipment was divided into five categories, with these results: (1) 200 amp and more were found in 81 homes; (2) more than 100 amp (110-175 amp) were installed in 264 homes; (3) 100-amp services went into 454 homes; (4) 70-amp services were included in 372 homes; (5) 40-60-amp services were used in 864 homes. These homes total 2,035 constructed during 1954.

To give a more complete breakdown of each individual job, I have determined averages for various installed electric features, which are shown in the accompanying table.

Three commercial sections of the report will be con-

Average for Electric Features

	Service Size	Avg. No. Circuits	Avg. No. Outlets	Range	Water Heater	Clothes Dryer	Exhaust Fan	Bath Heat	Disposal Outlet
1.	200 amp	30	110	Yes	Yes	Yes	Yes	Yes	Yes
2.	Over 100 amp	22	90	Yes	Yes	Yes	Yes	Yes	Yes
3.	100 amp	16	80	Yes	Yes	50%	Yes	Yes	Yes
4.	70 amp	10	75	50%	50%	50%	Yes	Yes	Yes
5.	40-60 amp	6	50	No	No	Few	75%	90%	Yes

"An electrical contractor can upsell wiring standards with the average individual because of receptivity."

Carleton J. Bunce, coordinator, Electrical Contractors Division
Bureau of Home Appliances, San Diego

sidered individually because of their particular significance.

1. Lighting fixture allowance per job has increased considerably in the past 3½ years and interest of the electrical contractors in this development was very noticeable. This is the way the figures averaged out: (1) in the 100-amp and larger services, allowances ran from $100 to $450; (2) for 70-amp services the average fixture allowance was $75; and for (3) 40-60-amp jobs the sum allowed was $50.

2. Low voltage control wiring, important only in that it provides for a more flexible and step-saving procedure in the home, is running far back in the number of installations considered during the survey. It was discovered that only 1% of the homes has this control feature.

3. One feature of the survey, which was not considered in the beginning because of a multiplicity of reasons, worked itself into a prominent spot after the first two or three contractor contacts. Beginning on almost a voluntary basis, we were able to gather dollarwise data as follows. Average cost to consumer: (1) 200-amp job equaled $1,500; (2) more than 100-amp job equaled $1,150; (3) 100-amp job equaled $750; (4) 70-amp job equaled $300; (5) 40-60-amp job equaled $200.

A significant contribution to the survey was the reaction of the electrical contractors to a series of questions regarding public or customer interest in electrical features and wiring of homes, building contractor participation in better wiring, percentage of built-in electric ranges, number of dryer circuits installed, exhaust fan installations, electric heating picture as they see it and bath heaters installed.

Public or Customer Interest—A new high in interest has been noticed by 90% of the electrical contractors; public is demanding more things electrically in the tract jobs as well as the private homes; electrical contractor can upsell wiring standards with average individual because of receptivity.

Building Contractor Participation—They have become conscious of electrical features in the homes because of public demand; this survey shows: (1) one builder in immediate postwar averaged 30 outlets per home, now installs double that; (2) another builder in 1953 built 60 homes with 40-amp services, in 1954 in 50 homes installed 70-amp services; (3) builders are preparing better electrical plants; (4) easier for electrical contractor to discuss his work with builder.

Built-in Electric Ranges—50% of range wiring is for this type; 90% of ranges are not sold by electrical contractors; range wiring is provided for or actually installed in 50% of residential occupancies; one contractor wiring 16 homes was able to sell eight on larger services and range circuits.

Dryer Circuits—A very popular wiring feature among owner and contractor groups; builders use it as a sales feature; one electrical contractor sells this circuit in 90% of the homes he wires; many rewiring jobs are created by electric dryer and range installations.

Exhaust Fans—Installation saturation is high for this device; many homes have two, three or four installed; high percentage is supplied by builder or owner.

Electric Heating—Radiant heating is increasing in acceptance; electrical contractors want more thorough and complete layouts; one electrical contractor claims 10% of all his jobs are installed with radiant heating.

Bath Heaters—Almost a complete saturation reached in installation of this device; a wide range is used today, convention type in wall and ceiling, radiant in floor, ceiling and wall, and lamp type in ceiling.

Another section of the survey covered rewiring jobs and it was possible to determine exactly that 774 jobs were executed during 1954.

All of the above information was collected from 15 different electrical contractors in practically every section of San Diego County. To complete our survey, we need but to project these figures among the other contractor businesses in our territory. This has been done and it presents a grand total of almost 4,000 new homes with an estimated value of $2,000,000, plus the rewiring market of almost 2,000 revamped old homes.

We feel that the foundation has been firmly installed and that our reports in the future will be both constructive and opportune in building and developing businesses that the electrical contractor groups can point to with pride.

Contractors' Division meeting at Escondido; A. H. Gudie speaker

"Top management today of necessity is taking a lively interest in the paperwork which threatens to engulf us and the procedures that go with it."

J. K. Horton, Vice-President
Pacific Gas and Electric Co.

The Problem Is Purely Economic—

WHAT IS THE PAYOUT?

J. K. Horton *

A utility man asks the questions about electronic data processing; a manufacturer's representative answers them

I HAVE been asked to premise Mr. Trexler's remarks on our current "glamour boy," the electronic digital computer, by stating the problem. That is easy enough, as I see it, but before narrowing the terms of reference, my point of view will be understood better if I mention the larger problem, of which this topic is a natural subdivision.

We start with the simple fact that tax-free competition from government agencies in the sale and distribution of the product which is our sole livelihood continues to have a short-range appeal to those consumers who are quite willing to temporarily shift the costs of government without facing the final effect on their tax pocketbook in the event all utility services were tax free.

We Are Compelled to Cut Costs

To state this another way—we are compelled to cut costs more than ever before—we have to be efficient to meet such competition.

That makes the statement of the problem rather obvious—it is purely economic—and, in my judgment, the use of electronic digital computers in our industry must be appraised in that light. I would guess that the nonutility side of our industry would look at this glamour boy in the same light.

What is the payout? Are the savings based on solid experience or is there quite a little sales talk involved? Knowing that the speed of a bullet does no good unless it is aimed right, how long will it take us to plan the program and approach to the use of such machines?

Are we missing the boat right now? Is there knowledge that isn't being put to work? Are we concentrating so exclusively on doing the best things that we are prolonging the debate unduly?

Now we are promised some information and reports from these high-speed calculators that we haven't been able to obtain up to date and these data can be of considerable value as a management tool. But such plus values are hard to measure and must be considered merely as plus values in making the decision to undertake these large investments.

And, speaking of investments, the smaller companies, both in and out of the regulated utility class, are eager to know the possible applications of this new tool to their business.

We are dealing with machines that appear to hold great promise for revolutionizing the office. According to the recent Hoover Task Force Report on Paperwork Management, the comparative costs of data processing for a specific process were as follows: hand calculation, $25; tabulating equipment, $4; automatic machine, $1. When you add to that finding the fact that in our business $500 saving in costs equals $7,500 in sales—in its effect on earned surplus—it becomes readily apparent why we have such a serious interest in this development.

Top management generally has permitted its office staff to fly by the seat of its pants, while it is insisting on maximum progress in its physical operations. One of the reasons advanced for this state of affairs is that office work is not a "crisis" operation on which company survival may depend—it is merely overhead!

I think all of this is about to change and in a big way. Top management today, of necessity, is taking a lively interest in the paperwork which threatens to engulf us and the procedures that go with it and so it is extremely opportune to hear about this dramatic business machine that deals with both paperwork and procedures.

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* Extracted from an address before Pacific Coast Electrical Assn., May 18, San Francisco.

"The future of your companies can be forecast for many years in advance, using hundreds of factors that may affect your economic growth."

George Trexler, Manager, Utility Department
International Business Machines Corp.

The Answer Is in the Record—a Faster

BETTER JOB AT LESS COST

George Trexler*

As a representative of a manufacturer of accounting and computing machines, I believe electronic equipment is now available to meet the requirements of a large portion of the utility industry from comparatively small to very large companies. Smaller units of this equipment are known as electronic computers, whereas the complete systems are referred to as electronic data processing machines, commonly known as EDPM . . . No one set of equipment or procedures will fit all situations.

What Can EDPM Do for Utilities?

This leads us to the natural and logical question: "What can electronic business machines do for you?" Mr. Horton has said that economy must be a motivating factor. So, let's do two things—look at the record and also look at some projected and anticipated economies.

Without too much fear of contradiction I can say that the public utility companies, and there are at least 100, using type 604 or 607 electronic calculators are doing a better and faster job with less expense than they were prior to the installation of those machines. The anticipated savings of the utilities having type 650, 702 and 705 data processing machines on order are very large. The *Wall Street Journal* cited anticipated savings for one of these companies of $750,000 annually. It is interesting to note that this same company had one of the most highly mechanized punched card operations in the United States. The fact that this saving will be realized from its customers' billing and accounting operations only is also significant.

There is no reason at this time to believe the savings anticipated by several utilities will not be realized and, in fact, it appears that they may even be greater. This should give you sufficient assurance that electronic business machines will prove to be economically sound for your companies.

What else can you hope to gain or accomplish through the proper utilization of these machines?

1. Better reports for all levels of management—including condensed statements for executives, district operation reports for division managers, departmental reports for district managers, detailed reports for department managers.
2. A greatly improved budgetary control system.
3. Forecasting—utilizing many factors in various combinations not economically feasible at the present time.
4. Greater security and return on investment for stockholders.
5. Commission and other bureau reports as a by-product of management reports.
6. A fast analysis of the effect of changes in operating conditions caused by: increase or decrease in industry by areas; increase or decrease in customers by areas; increase or decrease in load by areas; wage rates and fringe benefits; changes in rates for your customers.
7. Power plant efficiency studies.
8. Studies to determine the most efficient and economic interchange of power.
9. Studies to determine line losses.
10. The effect of atomic energy for power production—comparative cost of operation; the treatment of research and development cost; the effect of accelerated depreciation; the effect on your rate of return; obsolescence of present production facilities.
11. Automation for property records.
12. Depreciation studies for specific units of property.
13. Studies of specific units of property to determine the best maintenance or replacement programs.
14. Network analysis.
15. Engineering studies for new and additional facilities.

Many of the above possible applications and possibilities of accomplishment have not been considered accounting functions in the past and may not be in the future. This

* Extracted from an address before Pacific Coast Electrical Assn., May 18, San Francisco.

does not alter the fact, however, that electronic business machines can have a tremendous impact in these areas and have a real effect on the operation of the company.

Where Should We Start?

This brings us to the next logical question, Where should we start? Several major accounting areas immediately come to mind, each of which has potential economies.

1. **Customers' billing and accounting**—The capacity and logical ability of electronic business machines provide the means to make decisions, consolidate records, reduce file records and their maintenance, reduce communication time, reduce over-all access time and eliminate dual functions.

Due to the large volume of record keeping involved in this application, it probably offers the greatest saving because of the number of departments and people handling data having to do with either the customers or the customers' premises.

On this basis the application covers meter records, meter tests, service records, meter orders, meter reading, billing, reports and statistics, accounts receivable, credit and collection records, cycle balancing, controls, customers' deposits, merchandise billing and accounts receivable and the detailed unit property records for meters.

As you can readily see, this involves crossing departmental lines and the consolidation of records for a minimum of three and possibly five departments. Also apparent is the effect such a consolidation will have on files and their maintenance, and the reduction in communications between departments.

A number of the more pertinent operations have been briefly covered (see accompanying box) in order to call several of them to your attention. These include mark sense meter reading, meter in service record and meter order procedure, and the punched bill to provide a mechanized cash and accounts receivable procedure.

These procedures are essential to the full utilization of electronic business machines but they can also be profitably incorporated in your present punched card procedures. This being the case, it certainly follows that these changes should be made as soon as possible since they are natural stepping stones to the installation of a fully electronic system.

2. **Materials and supplies**—This is probably the largest single asset, except cash, requiring very close control. It is rather amazing at times to see how loosely this asset is handled and the lack of control to hold the investment to the smallest workable minimum in proportion to the cost of the records maintained essentially for this purpose.

Total inventory investment in this country today is over $77 billion. Twenty-five per cent a year, amounting to $19 billion, is the cost of maintaining these inventories. These costs include taxes, insurance, obsolescence, handling and record keeping. On this basis every $100,000 of inventory reduction will result in a saving to your company of $25,000 per year.

"There is no reason to believe the savings anticipated will not be realized and, in fact, it appears that they may even be greater."

Here Are Some of the Operations For Customers' Billing and Accounting

Since the variable input to such a system will at this time be punched cards, it follows that meter readings be recorded by mark sensing on a punched card designed to accommodate as many months readings as possible. It also follows that these reading cards need only have the service address and not the customer's name because all of the pertinent data including the prior reading and all historical data will be recorded from month to month on magnetic tape. This limits the meter reading card file maintenance to new meter locations, removed meters and meter changes. All customer changes will be recorded directly on the magnetic tapes.

The meter in service record will also be carried on punched cards due to the ease and simplicity of recording customer changes and the preparation of a punched card meter order by the simple process of duplication on a printing punch. These completed orders will be the medium to record the changes on the magnetic tape.

Estimation of readings for unread meters, consumption computation, a check of the usage with prior periods to determine its reasonableness, automatic correction of obvious reading errors, bill amount computation, the distribution of revenue and bill frequency statistics will be accomplished by the electronic system. In addition, all file maintenance including cash posting will be automatically accomplished by the system by recording these entries on the magnetic tapes containing the master record of the customers and premises.

Bills having the customer number and the amounts owed punched in the cashier's coupon will provide a means of mechanically balancing the cash and the input to the electronic system for the file maintenance operation.

Registers prepared daily and periodically will provide a medium for handling customer inquiries, preparing duplicate bills, statements and any other reference required.

The recently announced random access equipment known as RAMAC will eliminate the necessity of preparing many reports and registers due to its ability to locate and print data at high speeds. Five million characters may be stored on magnetic disks in one unit and the access time is very fast. By storing the data most frequently required for customers' accounts using 25 to 50 characters, it is possible to store between 100,000 and 200,000 accounts in a single unit. This will eliminate the preparation of periodic registers of balances and reduce the reference time to a very large extent.

Cycle balancing will be performed, meter test orders prepared and collection notices printed, based on any credit and collection formula you desire.

Most of your companies not only have one large storeroom but also a number of storerooms located at strategic points throughout their systems. Several problems are involved in the maintenance of inventory . . .

In order to keep your inventory to the lowest possible minimum, it is essential that your records show your position as quickly as possible after a transaction has occurred. The utilization of EDPM, in conjunction with high-speed

random access, should provide all of the necessary data immediately to:

- Issue a requisition based on quantity on hand, minimum balance, issues for prior periods, average monthly use, months' supply on hand and requirements for construction.
- List the vendors supplying such material.
- List material with which this item is interchangeable.
- Scan the supply on hand in other storerooms to determine if the requirements are available for transfer. If so, prepare transfer orders instead of requisitions.
- Prepare periodic reports of slow-moving items to reduce obsolescence.
- Prepare records of items to be inventoried.
- Automatically adjust inventories for proven overages or shortages.
- Maintain a running control of material on order and set up a contingent liability for such amounts.
- Prepare records to follow up partial shipments.
- Maintain a complete record of reels and drums along with their specific location and value.

Any system or procedure is only as good and as accurate as the available records permit. For this reason it is essential that the source documents are received on a scheduled daily basis from all storerooms.

A good working schedule and EDPM should combine to reduce your inventory, maintain it in this condition, provide excellent controls, eliminate files and require a much smaller clerical force.

3. Pay roll and related records—The operations involved in the preparation of pay rolls are ideally suited for an EDPM. The large memory capacity of this equipment allows the storage of such variable factors as rates of pay by occupation code and tax rates for all employees and the magnetic tapes will carry a complete record of the data for each individual employee. All information for the current pay period will be punched into cards and entered into the system.

The many files now required and manually maintained will be combined into the one tape record: (1) personnel records; (2) life insurance records; (3) sick and accident records; (4) vacation; (5) retirement; (6) bond purchases; (7) absentee records; (8) tax exemptions; (9) deductions; (10) year-to-date records of earnings and taxes.

It is interesting to note that, of the four public utilities having our electronic data processing equipment on order, three of them will start using it for their customers' billing and accounting while the fourth will start on general accounting with pay roll as the first application . . .

What Is the Logical Approach?

This brings us to the next phase of this discussion: What is the logical approach for you to take to determine how EDPM can be utilized advantageously in your company?

As stated previously, it is almost a certainty that the accounting applications will cross departmental lines. For this reason, any study should be instituted by the top executives of your company appointing a committee of qualified people, preferably one person from each affected department.

As an example, a study of customers' billing and accounting would include meter and test records, meter in service records, service orders, meter reading, accounts receivable and collections. This may include from two to six departments depending on your company organization. This would then require a committee of from two to six people who are thoroughly acquainted with your detailed operations. If your company has a systems procedure group, it will also be represented on this committee.

"...On this basis, every $100,000 of inventory reduction will result in a saving to your company of $25,000 per year."

This committee should be trained in the techniques of programming and operation of electronic data processing machines. This can be done by having them attend programming courses, for which our company makes no charge.

We will be pleased to assign the sales representative and technical personnel to assist in outlining the scope of this study, the preparation of detailed flow charts of present operations, block diagrams of the operations as they will be performed on EDPM, programming questionable areas and timing the operations to determine the type and amount of equipment required. Such a joint effort will save a lot of time and effort since all parties will be in agreement during the progress of the study.

Cost factors will then be applied and comparisons made with the present procedures. By this means, we will determine jointly the size, type and quantity of EDPM that can be employed economically for your operations.

At this point an order will be placed for the equipment and the committee will be augmented by additional personnel who will be trained in the programming courses. This trained electronics team, with the continued assistance of our personnel, will begin the detail programming of the selected applications.

The number of people and the amount of time required to study your present applications, diagram, program and test the programs will vary considerably with the volume of your job and the type of electronic business machines required. (Commonwealth Edison has 28 persons engaged in programming. It is estimated that about 35 man-years are required to do this work for its customers' billing and accounting operations.)

The over-all job can be segregated approximately as follows: Study and flow-charting present operations, 50% of time; determining item design and preparing block diagrams, 25% of time; detail programming in machine language, 15% of time; testing and correcting programs, 10% of time.

These time estimates can vary considerably depending on the specific accounting application and the type of electronic business machine best suited and economically feasible for your operations. The amount of time and effort required to reach these conclusions and completely program the work to be performed should not be underestimated.

After the EDPM is installed, your trained methods group will then study and program additional applications and study new problems to determine their possible mechanization. It is my belief that in the area of forecasting, budgeting, engineering, power loads and power interchange, this equipment will play a very important part in the growth and improved operations of your industry . . . Reports and statistics for all management or responsibility levels may now be obtained quickly, accurately and economically. The future of your companies can be forecast for many years in advance, using literally hundreds of factors which may affect your economic growth.

"If management is to operate on facts instead of on fantasies, it must accept the fact that good management is the proper use of good judgment."

Dr. Robert D. Gray, Director
Industrial Relations Section
California Institute of Technology

In Running a Modern Business the Big Problem Is

HOW TO TELL FACTS FROM FANTASIES

Dr. Robert D. Gray*

GROWTH of scientific management and its use in directing a corporation has stressed the need to ascertain facts. Frederick W. Taylor and other pioneers in the profession of management developed procedures to determine facts: What is a fair day's work? What is the best method for doing a job? What size and shape of shovel is best adapted for shoveling coal? for shoveling pig-iron? for shoveling dirt?

The present-day manager of a business or a segment of a business, whether he be president or division manager or first-line supervisor, has been trained to look for facts, and he prides himself on his use of facts. Some may even confess, or at least feel, that they are smothered with facts contained in a steady flow of reports and memoranda. Others may feel that they are required to spend so much time in developing and reporting facts that they do not have time to do their job of managing.

As managers develop, or review, this unending flow of facts, they come to certain conclusions. It is essential that they draw some conclusions in order that their work can be facilitated and improved. The only danger is that having come to a conclusion based on certain facts, some managers become impervious to other facts which do not support their conclusions. It is easy to notice later facts which support one's conclusions. It saves a great deal of mental effort to overlook other facts which suggest that the previous conclusions should be modified or even reversed. These conclusions which are based on some facts but which cannot be reconciled with all of the available facts can be described as "fantasies." As such, they are dangerous to the individual executive and may even handicap the corporation as a whole.

For this discussion I have selected these four statements:

1. There must be some formula, technique or device that will solve a personnel problem.
2. Improvement of relations between employees and management in my company depends on someone else, not me.
3. Supervisors and executives are born, not made.
4. Decision making is the primary essential of a good executive.

Let us look at some facts which show that each of these statements is a fantasy.

Fantasy No. 1—There must be some formula, technique or device that will solve a personnel problem.

The first fantasy to be examined is the belief that there must be some formula, technique or device that will solve a personnel problem. This fantasy is widely held and it is especially dangerous because most executives do not know that they have this fantasy. Whenever the question is put to an executive, "Do you believe that there is some formula, technique or device that will solve a personnel problem?" the answer is always "No."

The existence of this fantasy, however, is shown in many indirect ways. Here are two examples. (1) We have never conducted a meeting at Caltech on how to select employees without at least one person asking this question: "Isn't there some test we can give that will tell us which person we should hire?" (2) A well-known executive told me several years ago: "We don't need a personnel program in our company. Whenever employees get disgruntled, we just give them a raise. We have found that this is the cheapest way to handle personnel problems in our industry." This industry used to have the most unhappy employees in the United States. It discovered eventually that because of economic conditions it could not continue this policy of frequent wage increases. Within the past few years, this industry has tackled and solved its basic personnel problems.

The existence of this fantasy can be illustrated in many other ways. Over a period of time I have been told by many

* Extracted from an address before Pacific Coast Electrical Assn., May 12, San Francisco.

persons that they have used some device which has solved practically all their personnel problems. In one case it may be profit-sharing. In other cases it may be job evaluation or psychological tests or supervisory training or executive development. At the present time, many companies feel that automation will solve their personnel problems . . .

It is easy to understand why management is constantly seeking some formula, technique or device that will solve personnel problems. Time spent on solving personnel problems may appear to reduce the time available for solving "more important" problems of production and sales. Experience shows, however, there is no formula yet available, and the following facts suggest that no such formula can ever be developed.

One important fact to be considered is that change is inevitable. Our business system is dynamic. Every company is bound to have new people, new products, new processes, new methods, new markets. Every technique must be constantly adapted to meet these changing conditions.

Another fact to be considered is that in the field of management, no device can be guaranteed to produce the desired results. The plans that have been successful in certain companies over a period of years have been subject to many modifications to meet the changing conditions, both within the company and outside. No matter how long a plan has been used successfully by a given company, it cannot be applied directly to other companies. The plan must be adapted to fit the situation in each company . . .

If management is to operate on facts rather than on this fantasy that there must be some simple formula, technique or device that will solve a personnel problem, it must accept as a fact that good management is the proper use of judgment. Policies are important as statements of objective and in providing guideposts for action, but judgment is still required in order to select the proper policy and to make the proper application of that policy to the particular situation. Management should face the fact that if, as, and when businesses can be operated without judgment, there will not be any need for management. Management should recognize that it needs to develop good judgment. The best help I can provide on this is to repeat the punch line from a story told by A. E. Grauer, president, British Columbia Electric Co. Ltd.: "Good judgment comes from experience. And experience? Well that comes from poor judgment."

Fantasy No. 2—Improvement of relations between employees and management depends on someone else, not me.

When this fantasy is stated bluntly, you may feel that it could not be a prevalent one. It may appear in a softer version through an expression such as, "I wish my boss could have been present at this discussion." There is, of course, some truth to the saying that "those who need to be saved do not go to prayer meetings." All of us, however, have a tendency to pass the buck. When we recognize that there is a problem to be solved, we may easily feel that its solution depends on our superiors, upon a staff department, upon our subordinates, perhaps even upon the government. It is true that some or all of these agencies may help.

I would like to give you an extended case history which illustrates the existence of this fantasy and give some facts that dispel the fantasy.

The case begins several years ago when we conducted an opinion poll among the supervisors of a large, well-established corporation. Among other questions was this one: "What do you think about the company's method of selecting new employees?" Here are the results: (1) Poor, 18.4%; (2) fair, 45.1%; (3) good, 32.0%; (4) excellent, 4.3%; no answer, 0.2%.

The supervisors also provided 399 detailed suggestions on how the method of selection could be improved.

This information aroused the interest and concern of top management. Additional facts were secured and eventually the company decided that its methods of selecting new employees should be improved.

In 1954 the Caltech Industrial Relations Section was asked to develop a program on selection and appraisal of employees for 24 representatives from this company. Those attending the conference were given some information which they in turn could pass on to other supervisors.

During the conference with these key supervisors, there were many discussions as to just what could be done. Some of the representatives felt that they could not do anything until the company changed many of its policies and procedures and developed some new ones. It was relatively easy for the group to agree that the company should undertake a study of a variety of long-range solutions.

After the group had agreed that there were many aspects of the employment process that could be improved by someone else, it was possible to get them to focus their attention on what each supervisor or interviewer could do immediately, without any change in company policy or procedure and with a minimum of expense to the company. The group was quite surprised to find that it eventually could agree on nine improvements in its individual performance.

This company is now making substantial improvement in employment processes because agreement has been reached as to exactly what each individual can do. Supervisors are improving their interviewing techniques and are improving their induction of new employees. Both of these responsibilities had long been assigned to these supervisors and no further approvals were needed. At the same time the personnel department and top management are making progress in solving the aspects of the employment problem which are truly their responsibility. Thus the company is securing some immediate improvement in its employment processes, and it can expect still further improvements in the future as the longer-range studies result in new policies and procedures.

In any corporation it is probably true that no one person can solve a problem in its entirety. On the other hand it is very likely that everyone can contribute to a solution. It is very important that the problems be recognized as problems, and that responsibility for solving problems be assigned in line with the facts. Most supervisors and executives can contribute more to a solution of a problem than they are inclined to recognize.

There is a widespread feeling among first-line supervisors that there is little they can do in building morale within an organization. Supervisors have learned from experience that they are not the company. On the other hand, however, supervisors may have forgotten that from the employees' point of view the supervisor is the company. At the same time the supervisor may not believe that top management wants employees to regard their supervisor as the company.

In an attempt to learn what employees think of various personnel programs, we have often given employees a list of a variety of policies and procedures asking them such questions as: Which are most important? Which are least important? Which are best carried out by the company? Which are worst carried out?

Table I
Ten Most Important Items in Rank Order

	Percentage
1. Steady employment	71.2
2. Chance for promotion	54.4
3. Hospital and surgical insurance	51.5
4. Fair pay for efforts	51.5
5. Group life insurance	42.6
6. Recognition for work well done	37.5
7. Vacations with pay	33.0
8. Recognition as an individual	25.8
9. Good supervision	24.9
10. Holidays with pay	21.4

Table II
Ten Best Carried Out Items in Rank Order

	Percentage
1. Hospital and surgical insurance	56.8
2. Group life insurance	55.5
3. Vacation with pay	36.8
4. Credit union	35.8
5. Plant housekeeping	35.0
6. Holidays with pay	30.8
7. Steady employment	30.6
8. Recreational and social activities	23.6
9. Restrooms	22.7
10. Reputation and prestige of company	21.4

Table III
Ten Worst Carried Out Items in Rank Order

	Percentage
1. Chance for promotion	53.5
2. Recognition for work well done	51.5
3. Recognition as an individual	45.8
4. Fair pay for efforts	40.5
5. Good supervision	36.5
6. Training programs	35.7
7. Personal counseling and aid	25.0
8. Safety activities	16.2
9. Plant housekeeping	11.4
10. Cafeteria	10.4

Here is a typical list which we used in a recent survey: (1) Chance for promotion; (2) credit union; (3) fair pay for your efforts; (4) group life insurance plan; (5) hospital and surgical insurance; (6) personal counseling and aid; (7) plant housekeeping; (8) company magazine; (9) recognition as an individual; (10) recognition for work well done; (11) reputation and prestige of your company; (12) restrooms; (13) holidays with pay; (14) steady employment; (15) good supervision; (16) training programs; (17) vacations with pay; (18) cafeteria; (19) recreational and social activities; (20) safety activities.

The study of this list will show that some of the items are primarily under the control of top management, some items are primarily within the control of the first-line supervisors, and some may be affected by both top management and supervisors.

An over-all view of what those employees thought of the personnel policies in their company can be obtained from an analysis of the accompanying tables. The employees were given this list of 20 personnel policies and procedures and were asked to select the five most important, the five least important, the five best carried out, and the five worst carried out.

No one of the 20 items was listed as most important by all the employees. On the other hand, every item was among the five most important to some employees. This diversity of opinion was found in all parts of this question.

The list of 10 most important items shown in Table I may be further broken down into the items that are affected primarily by the company as a whole including outside factors and those which are affected primarily by immediate supervision. The company or general factors would include steady employment, hospital and surgical insurance, fair pay for efforts (in part), group life insurance, vacations with pay and holidays with pay. On the other hand the following items are within the control of immediate supervision: chance for promotion, fair pay for efforts (in part), recognition for work well done, recognition as an individual and good supervision. The answers to this part of the question give the company a target at which to shoot since good management indicates that a company should focus its attention on what employees think is most important to them. The results show the variety of interest of employees and emphasize the need for effective over-all policies and good immediate supervision. If the 10 most important items are taken as the target, it is fair to make a comparison between the 10 most important and the 10 best carried out. The 10 best carried out are listed in Table II.

The principal observation to be made on what is best carried out is that the items are primarily those that are within the control of the company as a whole. The only exception to this is plant housekeeping which is a responsibility of supervision.

The company as a whole is doing an outstanding job because all of the items which were most important and primarily with the control of the company are also among those best carried out. The only exception may be the item of "fair pay for your efforts" which is partly the responsibility of the company and partly the responsibility of supervision.

Another measure of how well the personnel program and policies of the company hit the target established by the employees is the analysis of what was worst carried out. The 10 items are listed in Table III.

The need for improved supervision is emphasized by the fact that all of the items which were most important and were within the control of supervision were rated as among the worst carried out. This applies especially to chance for promotion, recognition for work well done, recognition as an individual, good supervision, fair pay for efforts (in part). The only item that was regarded as worst carried out and which was not in whole or in part the responsibility of supervision is the cafeteria. It should be noted that only 10% of the employees regarded this as worst carried out.

The fact that plant housekeeping appears both among the best and among the worst carried out shows the influence of supervision since it is possible for it to be well done in some departments but not in others.

These are but a few of the facts that are available to show that everyone in management can help improve relations between employees and management in his company and that supervisors have an especially important role to play. This conclusion leads to the third fantasy.

Fantasy No. 3—Supervisors and executives are born, not made.

Many executives when thinking of their own successes do not succumb to the fantasy that supervisors and executives are born, not made. Such executives may claim to be self-made and will hotly deny that they were born that way. Such conclusions are most pleasing to their parents because it relieves them of responsibility.

On the other hand most executives can cite at least one case from their own experience to prove that supervisors

Table IV
Unfavorable Opinions about First-Line Supervisors in One Company

Aspects of Supervision	Percentage of Unfavorable Opinions
Gives credit where credit is due	48.0
Gets cooperation of employees	44.5
Is willing to discuss complaints	43.5
Keeps employees informed	37.4
Is willing to discuss suggestions	34.1
Explains company policies	34.0
Is fair with all of us	32.3
Discusses job performance	32.1
Explains job duties	31.0
Gives help when needed	29.7
Keeps his promises	29.2
Plans work	29.1
Assumes his responsibilities	23.1
Shows interest in safety	16.9

and executives are born, not made. Probably every executive has selected at least one subordinate supervisor who seemed to have outstanding education and experience and who received careful training and coaching on the job but who failed miserably as a supervisor because of some unexpected weakness. Such an experience proves only that no selection technique is perfect and no training method is guaranteed to succeed in all cases. There have been failures in every kind of position.

There is, of course, some truth to the feeling that supervisors and executives are born, not made. It is obvious that everyone cannot be made into a successful supervisor. Good supervision is both an art and a skill. Everyone cannot master a specific art or skill, but it is also true that no one is born with a mastery of any art or skill. Individuals are born with different degrees of intelligence and with varying aptitudes. If we recognize that supervision is both an art and a skill, we must try to select those with the greatest aptitude for such work. We cannot, however, expect them to succeed without some training. It is especially important to provide such training if supervisors are to conform to standards and procedures established by a higher management.

Our opinion surveys have provided many insights into what makes supervisors successful. The surveys also measure the value of previous training and point the way to subjects on which further training is required.

Some results from a recent opinion poll are shown in Table IV. To highlight these results, we are showing just the negative figures. The general impression from these responses may be that employees are highly critical of their supervisors or that these supervisors are incompetent. When I first saw these figures, however, I placed a different interpretation on them. I suspected that the supervisors had not been trained in most aspects of their jobs. You will note that there were relatively few criticisms of the supervisors on their attitude toward safety and not many criticisms as to their not assuming their responsibilities. Before showing the results to the company, I asked about what training had been given on these two aspects of supervision. I was told that the company had recently completed some training programs which did emphasize safety and did emphasize the fact that the supervisor had many responsibilities and that he was expected to carry his responsibility and not to pass the buck. I then asked what other kinds of training had been given to the supervisors and learned that no other training had been given. With this additional information, the results of the opinion poll can have another interpretation. I suggested to the company that they did have a good group of supervisors, that the supervisors did respond to training, that the company had some responsibility to provide such training, and that the evidence suggested that the supervisors would respond to such training.

The growing interest in supervisory training and executive development is an encouraging sign that many individuals in management are not accepting the fantasy that supervisors and executives are born, not made. It is encouraging that companies recognize that the art and skill of supervision can be improved with proper training. It is to be hoped that this confidence in training will not be so exaggerated that companies fall into the first fantasy I mentioned—that some formula, technique or device such as supervisory training or executive development will solve a personnel problem.

Further improvement of supervisory training and executive development requires careful study of the job of supervision, the essential qualities of an executive, the nature of leadership, and other basic studies of management. Some of these studies seem to be leading to the fourth and final fantasy to be discussed.

Fantasy No. 4—Decision making is the primary essential of a good executive.

There is a great deal of truth in the statement that decision making is the primary essential of a good executive. Many executives and many students of management have made similar observations. John H. Patterson defined an executive as "a man who decides: sometimes he decides right but always he decides." Fred De Armond in *Executive Thinking and Action* says: "The life of an executive is just one decision after another." Any organization will grind to a halt if the boss cannot or will not make a decision.

I have classified this belief as a fantasy because it is an over-simplification of the problem of being a good executive. Such an over-simplification is dangerous because it suggests that the way to improve executives is to increase their ability and authority for making decisions.

This belief may conceal the need for proper organization. An executive may feel that he should make decisions himself rather than delegate authority and responsibility to others. Policies and procedures may not be established because the executive believes that he should decide every case on its own merit. These are but a few of the factors that can be concealed by acceptance of this particular fantasy.

It is important, however, to examine one other oversimplification which is inherent in the statement that the decision making is the primary essential of a good executive. Perhaps this might even be described as another fantasy: "communication is the art of supervision."

At the present time authorities on management appear to be divided. One school of thought holds that decision making is the key to improved management. Another school believes that improved communication is the answer. Perhaps we are seeing a modern day version of the "six men from Hindustan who went to see an elephant though all of them were blind." Each school is seeing only part of the problem and they do not realize that they are seeing different parts of the same problem. Decision making and communication are inseparable.

How can decisions be made without communication? In the first place, a great deal of communication must take place in order that an executive may know what decisions are required and in order that he may secure facts on which to base his decision. Opinion polls, including many of the

Table V

How do you feel about the amount of information your company gives you on:

(Composite opinion of employees in several companies)

	Not Enough %	About Right %	Too Much %	No Opinion, No Answer %
What other departments do	44.1	40.6	0.7	14.6
American business system in general—how it operates	40.6	37.3	1.4	20.7
Employees and their jobs	38.6	49.9	1.1	10.4
Company expansion plans	34.9	53.1	0.7	11.3
Personnel changes	31.7	54.8	1.8	11.7
Company's relations with public	31.2	55.2	2.2	11.4
Information on employee benefit plans	22.6	69.8	1.1	6.5
Company's financial problems—income, expenses and profit	18.8	66.6	1.9	12.7

(Composite opinion of supervisors in several companies)

	Not Enough %	About Right %	Too Much %	No Opinion, No Answer %
What other departments do	40.8	53.4	0.1	5.7
Company expansion plans	39.3	57.6	0.7	2.4
Personnel changes	27.9	67.9	0.7	3.5
Employees and their jobs	27.3	64.5	1.4	6.8
Information on employee benefit plans	22.7	73.6	0.4	3.3

results already cited, show how communication is essential to know what decisions should be made.

Many companies are afraid that they are already giving too much information to employees. This question has been studied in a number of polls. The composite results are given in Table V. One significant fact is that very few employees feel that they are getting too much information. There are also many cases where more than one-third of the employees indicate that they are not getting enough information.

Undoubtedly more information is being given to supervisors than to employees. Even among supervisors, however, very few feel that they are getting too much information. The combined results from a number of companies suggest that there are some subjects where more than one-third of the supervisors feel that they are not getting enough information.

Opinion polls are also useful in measuring the need for communication. It is dangerous to assume that employees know certain facts. It is equally dangerous to assume that employees are ignorant.

It is easy for executives to grasp the fact that decision making follows communication. Executives need to know that the problem exists. Since they must have facts on which to base a decision, communication must precede decision making. But this is only part of the complete picture.

A frequent mistake on the part of management is to overlook the need for communication after the decision has been made. A supervisor requests a wage increase for one of his men. His recommendation is approved promptly. What thought is given, however, to how the employee is told about his wage increase? The executive receives a report including recommendations for action. He studies the report carefully and approves it. What consideration is given to how the recommendations will be put into effect? A committee meets to discuss a pressing problem. Eventually a solution is developed which is approved by everyone present. The meeting then adjourns, with no discussion as to how the decision will be put into effect, who should be told about the decision, when the news will be released, to mention but a few of the questions in communication.

Opinion polls have also been useful in giving management an appraisal of various media of communication.

In these cases the employees and supervisors were asked to indicate the media through which they were *now* receiving most of their information about the company. In a parallel question they were also asked how they would *prefer* to receive such information. Table VI shows the results. It is apparent that fellow employees, or the grapevine, is one of the most common sources of information for employees and that many supervisors also have to depend on it. Neither employees nor supervisors prefer such a method, however.

Employees are willing to accept methods such as bulletin boards or company magazines as a source of information but they prefer special bulletins or letters to them as individuals. Face-to-face communication such as talks with their supervisor or group meetings are most acceptable.

Supervisors and managers are even more emphatic in wanting to secure information through face-to-face meetings or talks. They want to receive information before employees receive it and, for this reason, have little preference for bulletin boards or company magazines.

These results are based on a number of surveys, but it should not be assumed that they apply to your company. This word of caution must be applied to all of the facts presented in this paper. These are facts in specific situations, but they may not be the facts in your case. Your decisions must be based on the facts as they exist in your own company. They must be put into effect in such a way as to give you the best results, using the method that will be most effective for you. I do not want to create another fantasy that all of the results presented apply to you. These

Table VI

Sources of information reported by employees:

(13 companies)

	Now %	Prefer %
Fellow employees	21.3	1.7
Bulletin boards	16.6	15.6
Company magazine	21.8	15.7
Special bulletins and letters to employees	14.3	22.2
Group meetings	4.7	17.2
Talks with supervisor	12.9	22.0

Sources of information reported by supervisory and managerial personnel:

(7 companies)

	Now %	Prefer %
Fellow employees	12.7	0.7
Bulletin boards	2.9	3.1
Company magazine	8.0	5.2
Special bulletins and letters to employees	26.2	25.8
Group meetings	15.6	23.8
Talks with supervisor	32.9	43.6

(Data do not add to 100% because some choices have been omitted.)

results merely suggest that you should question some of your present beliefs and look for all of the facts.

It is easy for many half-truths, partial truths and myths to develop among groups of people. Since a corporation consists of a group of people—employees and management—it is to be expected that certain fantasies will develop and may become accepted. Four such fantasies have been explored in order to show to what extent these beliefs are true and to what extent conflicting evidence makes it necessary to modify these beliefs.

At the same time a number of facts about corporations and about the individuals within corporations has been developed. As these are accepted and put into practice we can expect an even greater growth of corporations. Through the application of these facts, the individuals within corporations will not only develop but they will also increase their effectiveness. Corporations will become as beneficial to those within—both employees and management—as they have been to stockholders, suppliers and customers.

With Coats Off and Working Together

LET'S FILL THE EMPTY SOCKETS

Mark C. Brown*

THERE'S nothing more useless than an empty socket! It may have found its way into the home as the result of a well-conceived, far-sighted adequate wiring program. It may have been installed by a builder with vision. It may have been the by-product of an electric water heater or range installation. But there it stands, a useless thing, doing nobody any good. We both look on this empty socket as a challenge, as our enemy. Let's see what we, together, can do about it. First of all, let me say, I look upon the filling of this socket as a primary responsibility of the retailer. It is a by-product of his contribution to the industry.

Frankly as a dealer, I feel so kindly toward our utility for the help it constantly offers, that I look upon it as a big brother. We have already received more help, and guidance, and inspiration from our power company than I could have dreamed up in a lifetime and, yet, they tell me it's only the beginning.

I sincerely feel that the member of the team who is dragging his feet in this drive to promote more sales through the dealer is the dealer himself.

If every dealer were geared to take full advantage of all the sales helps and promotional effort even now available to him through the utility, the distributor and the manufacturer, this part of the program certainly would have been omitted.

I feel that no dealer has a God-given right to income, to a specific market, or even to a territorial franchise for a brand. Any hold he has on these three things must be earned, earned by creative salesmanship, by finding the customers in whom needs and desires, ambitions for better things and freedom of the woman of the house from a large part of her drudgery can be stimulated.

I have frequently sat in meetings and heard the wrangling and jangling and whining of dealers who think because they have a store and a few appliances that the world owes them a living. Their usual solution to their problems is to have the manufacturer prepare a schedule of prices that will show a minimum of 50% gross profit to the dealer and then to supply a policeman to stand in each of his competitors' stores to see that no one sells for less than the list—with the possible exception of himself, of course.

Another thorn in the side of many dealers is the chain store competition, and this is real competition. But it's clean and above board. When a large chain store establishes a price of $199.95 it doesn't settle for $199.50.

I spent nearly half of my life in the employ of Sears Roebuck & Co. I believe I know why it sells appliances in such tremendous quantities. I have attended many of Sears merchandise presentation meetings wherein the sales promotion boys present and build up the new merchandise. The advertising men lay out the campaign as they have prepared it. The display department shows the material it has developed, the departmental layout, the window tie-ins, and everything is synchronized to perfection. When the merchandise hits the store and the campaign gets under way, the ones who do not tie in wholeheartedly and fail to get their share of the business very likely will not be there when the next meeting rolls around.

Most every major line of appliances on the market today has just as well thought out plans for the presentation of their product as has Sears Roebuck. They have sales promotion experts and display departments and advertising men who are just as capable as Sears men are. But here is the difference. They don't have the control over their retail outlets that Sears has.

The best laid out promotion in the world is worthless if it dies at the retail level. If the dealer who carries a smattering of several lines of white goods is pushing Norge refrigerators when Philco's big national promotion on the Dairy Bar breaks, what happens to the thousands of dollars and the time and production that Philco put into the merchandising of its product?

This I will guarantee—when Sears breaks a national promotion, not a single one of its stores is promoting Montgomery Ward's refrigerators at the moment. I'll wager that there is not one single dealer in your town that does not have valuable display material supplied by his utility or distributor or manufacturer piled up in his back room unopened. I feel sure that many fine promotional plans that have been worked out by high-priced sales promotional experts have been laid aside and forgotten until their usefulness has passed.

We create a sale by creating a want, by selling a customer on a desire for a new appliance; a freezer that saves shopping hours, that conserves income, that permits year-round use of what we grow in our gardens; a dryer that gets rid of the old clothes lines and makes basement and back yard

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* Extracted from an address before the Business Development Section of Northwest Electric Light & Power Assn., May 9, Salt Lake City.

"No dealer has a God-given right to income, to a specific market or even to a territorial franchise . . . Any hold he has . . . must be earned."

Mark C. Brown
Mark Brown Home Furnishings, Salt Lake City

room available for better living; a dishwasher, garbage disposal unit, ironer, or any of a dozen easy-to-use traffic appliances. It comes from getting to that customer first with the idea; from ads that sell the need and the benefits more than how much cheaper it is to buy from your store; from mailings, phone calls and in-home visits.

The dealer who can do this, who can do it skillfully, with well-chosen, well-trained salespower is the one who can prosper, can command a measure of franchise protection and, most important from your standpoint, can fill that empty socket.

Now when we consider what the utilities can do to promote more sales through dealers, let's have the picture of this dealer in mind. Any departure from concentration on him is a shift to expedience, to talking to yourself, desirable perhaps, but ornamentation rather than the primary objective. Who is this dealer? He could be any now in business if only a few slight changes were made in his mental attitude and in his approach to business. The utility can play a vital and dominant role in effecting these changes.

To criticize the utilities for what they are doing would be a most unfair and unjustified abuse of what brings me onto your program today. They deserve commendation, not condemnation. Consider these suggestions I make, then, as well-intended recommendations for additional activity, likely to bring them greater reward from their dealer activities. What we need most is education and inspiration, presented in a way that shows our big brothers, the utilities, to be understanding and, in a measure, sympathetic with the problems facing retailers today.

It is not my purpose to expect utilities to fight the dealers' battles for them nor to engage in trade practices that I am fully aware are not in their province. Let's pry into the retailer's mind, though, and see what has numbed his inactivity, frightened him into foolish activity, or caused him to seethe with an impotent indignation.

The appliance industry has tremendous productive capacity. Some of the manufacturers have simply produced more than ordinary sales activity can absorb without leaving other brands pretty much out in the cold. The stronger brands have practically commandeered the best retail outlets with powerful incentives. Other brands have gone to distributors who, being unable to eat appliances, have had to franchise marginal outlets or even sell them directly to consumers in "back door" selling. Some dealers, either through having attained such size they can swagger a bit or through a sense of justified reprisal because of real or fancied offense, are transshipping merchandise, further complicating the problem of orderly distribution of goods. Fair trade, which sought to protect dealer margins on a few products — well below 5% of the dollar volume of appliances — is seriously threatened and may not exist in many markets a year from now.

We have more dealers than we need to serve our markets properly. Much merchandise intended for a specialized builder-sales market is being deflected into normal retail channels, and this is sold at prices below that sold to dealers regularly. Add to this the growth of the discount houses in recent years, and you can see what a mess the dealer's mental attitude has become. If you were a dealer, particularly one who's been in business for years and helped create the acceptance for products and brands thus treated, your mental attitude would be just as seriously threatened.

Yet, dealer security has been threatened before. He's always had troubles of one sort or another. Someone is going to move this merchandise and keep the industry growing. It's always been and always will be mainly the fellow who can muster a degree of specialization in this growing category of products we call appliances. There are going to be new fortunes made and old fortunes made to grow by dealers in this field. *You* can help, by sticking right into the areas where utilities can properly function. It can be done positively, not by any thought of putting anyone out of business or serving as an arbitrator or policeman.

Let's all shuck off our coats and start working with these dealers we have, working with them in a way they understand, and believe, and will respond to!

How? Like this:

First—Encourage the dealer not to try to stock more lines of merchandise than he can do justice to. The majority of dealers today cannot properly handle more than one brand. A dealer will do a much better job by stocking one brand as completely as possible than to have a smattering of everything that comes along. Every major manufacturer has a well-rounded line that offers a complete selection of models in a logical step-up sequence. No dealer should consider a second line unless he has more space, more manpower, more promotional capacity, more money and more

"The best laid out promotion in the world is worthless if it dies at the retail level."

customers than are needed to do a good job with his number one line.

There is nothing that creates more confusion in the customer's mind than standing in front of two refrigerators, trying to decide which one to buy, while he listens to the double talk of a salesman who doesn't know which one to sell because he doesn't know which one the customer would be most likely to buy. To know a line so thoroughly and to believe in it so firmly that there is no question in a salesman's mind, makes it easier to create a desire in the customer's mind for the thing he has to sell. Confusion is eliminated and sales effort doesn't need to be soft pedaled for fear of striking the wrong note.

Second—Keep up and expand the fine program of home economics demonstrations to women's social, civic and religious groups and through educational institutions. Potent and prolific seeds of desire can be sown in fertile ground here.

Third—Keep up and expand your fine program of putting information and selling know how into the hands of your dealers. The Utah Power & Light Co. has done an excellent job in this respect, and I have here a few of the brochures prepared for dealer and consumer use.

Fourth—Give all the support possible to the local organization working with the dealers and embracing them as members. Give it meeting space, what financial aid you can, what manpower it needs and you can supply. And call on its dealers for assistance in planning merchandising programs.

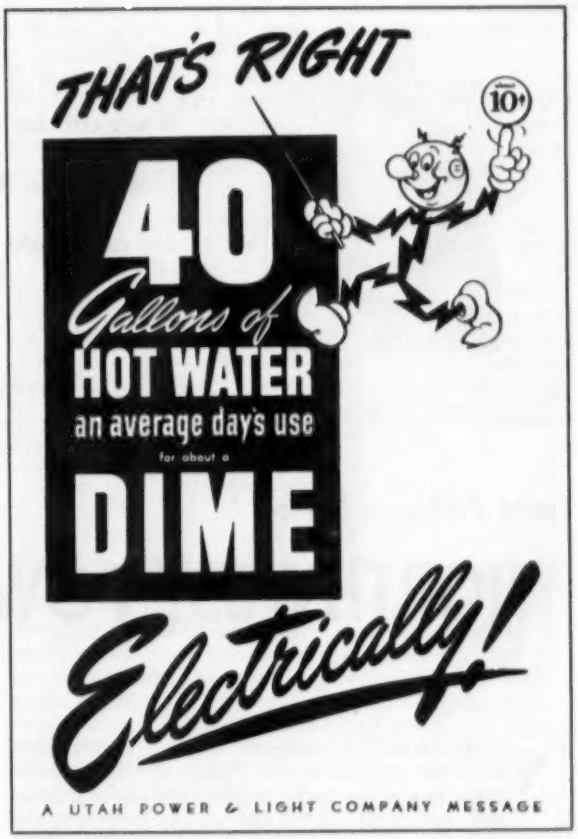
At this point I would like to acknowledge the tremendous support our utility has been to the Intermountain Electrical Assn. of which I am past president. It has poured financial help and manpower assistance into this organization when, I am sure, it looked as though it were pouring it down a rat hole. But today the organization has grown in strength and membership and is accomplishing a great deal of good for the dealers. Here again are a couple of brochures prepared by the power company in production of which dealers were asked to participate. If you do not have such a group, help to form one.

Fifth—Bring to each meeting an authoritative speaker, someone who knows the problems and has at least part of the answer. All over the country are successful retailers, men who have demonstrated that belief in our industry, hard work, and business acumen, skill in finding and training men and working as friends with suppliers can pay off. The National Appliance and Radio-Television Dealers Assn. can find dealers of this sort for you.

They'll come to your cities if you'll just pay their transportation and give them your dealer audience. Or, if you prefer, it will arrange for spokesmen from leading factories —people who work with dealers all the time and know what makes them tick—to come address your dealers and the factories will take care of the transportation cost!

Sixth—Study dealer problems locally and see which you can properly participate in. Perhaps it's an advertising code of ethics which the local Chamber of Commerce, Better Business Bureau, Retail Merchants Assn., or some other group will help on. Perhaps it's no more than advising the dealer organization leaders when to call on the district attorney to assist in prosecuting racketeers in the field. Some have been helped by reduction of the numbers of classifications in the classified phone book.

Nor does it have to be anything this dramatic. Soon it will be time to prepare for color television and perhaps get a course started. Sales training clinics, if properly merchandised, may strike the right note. Appliance servicing, a session on how to evaluate, recondition and sell trade-ins are other possibilities. Do a couple of these things for the dealers and they'll be far more likely to participate with warmth and vigor in your seasonal product promotions.



Utility ads like this one promote sales of electric equipment

Seventh—Analyze the annual costs of doing business (surveys provided by national organizations). They show weakness in the dealer operation. They give you sales points on why more emphasis should be placed on a low-saturation item. Such apparently marginal activities as selling kitchens, result in sales of dishwashers, garbage disposals and new appliances which help you. At the same time they give dealers FHA-financed sales that may run well over $1,000 apiece at a full 40% mark-up without a heavy inventory burden. Let him know that you know and care about his business costs. It means something to him.

Eighth—Join the national organization as an associate member. It won't cost you much, and it will give you exposure to much of this same wholesome thinking, the attitude of the healthiest and most successful clean dealers in our industry. It will also provide you with a powerful ally in all of your dealer problems.

By doing this—helping your local organization or forming one in your area, bringing people who have met the same problem confronting the dealers to your retailers and letting them educate and inspire your problem children, finding local problems on which you can assist, and training areas in which you can develop participation, studying dealer operating expenses and finding the powerful sales arguments they reveal, and working with the national dealer organizations as an associate member—you'll find a new, healthier sense of reciprocal identification of dealers and utilities with each other's problems.

And then—together—we'll do our job of getting those empty sockets filled.

"If we can be about 15% effective in solving our problems within the next year, we will be on the track of an adequate future power supply."

W. Jack Mosley, Coordinating Engineer
Governors' Power Policy Committee

Three Problems Retard

NORTHWEST POWER DEVELOPMENT

W. Jack Mosley

NONFINANCIAL problems deterring construction of hydro projects in the Pacific Northwest have been classified by engineers into three major groups: (1) license objections; (2) fish and wildlife problems; and (3) the upstream-downstream problem. Under these three general headings, the problems of clearing deterrents to new construction are numerous and varied. A survey of these matters has indicated that for the 36 actively sponsored projects there are some 75 individual situations that need to be resolved.

All these are matters other than those of financial feasibility. However, the need for capital to finance new projects should not be overlooked. For the next several years, the requirement will be between $200,000,000 and $300,000,000 per year. This money would be required from the different builders, including federal agencies, private utilities and nonfederal groups. Indications are that adequate capital funds can be arranged if other matters are resolved.

Political Conflicts

Some of the situations that arise as license objections are well known to all. Certainly the controversy over development privileges in the middle reach of the Snake River has been more than adequately publicized. In addition, however, there are other developments that are feasible and desirable from the power viewpoint, which are being delayed by similar political and public conflicts.

Such projects have been subjected to exhaustive engineering appraisal but the factors causing delays are outside the field of engineering solution. In these matters, the engineers have gone only so far as to advocate that every justifiable means be employed to expedite fair and decisive resolution of waste-producing controversies.

Another group of proposed hydro projects is involved in the procedures for implementing partnership arrangements between power and federal agencies. Since advent of the partnership idea, six proposals have been advanced in the Pacific Northwest. To date none have been consummated. As the elements of these procedures crystallize into recognizable practicable forms, it will be helpful in moving forward to actual construction of these worthy projects.

Fish and Wildlife

The most widely prevalent problem in clearing proposed hydro projects for actual construction involves proper handling of fish and wildlife populations. All the sizable proposed hydro projects face this problem in a greater or lesser degree. Some developments are completely stymied. Others require time-consuming study, research and planning. In an effort to overcome these situations in a sensible manner, representatives of fish and wildlife and power interests are actively engaged in comprehensive research programs. These people fully recognize the need for continuing coordination of technical advances and for mutual consultation.

As a result of these efforts an improving atmosphere of mutual respect seems to be developing. There is reason to hope, and to believe, that the problems are not insoluble. It would be unrealistic to predict the immediate resolution of these problems. But it does seem apparent that hard, earnest work in the fields of technical and human relations will begin to bear fruit in the not too distant future.

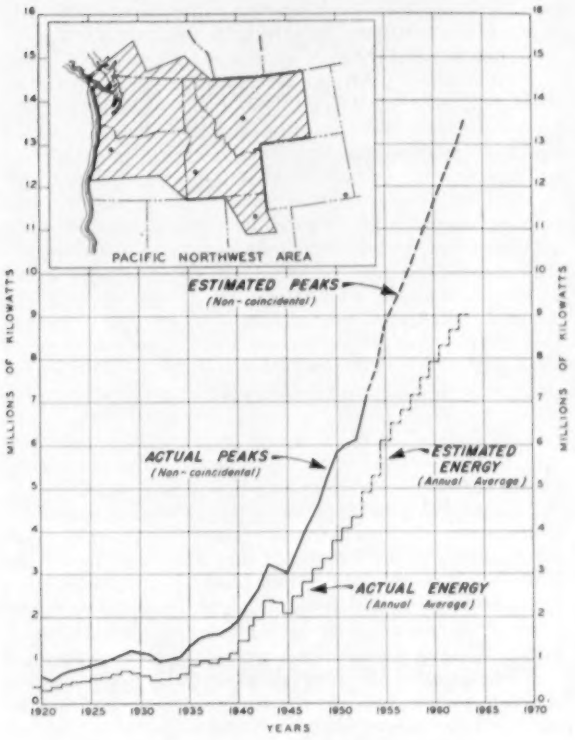
Upstream-Downstream Problem

The majority of all future hydro power developments in the Pacific Northwest will be situated so that either their power production will be directly affected by rates of water discharge from upstream projects or their rates of water discharge will directly affect power production at downstream projects. When such upstream-downstream situations exist, there arises the need to provide fair and equitable compensations for the resulting benefits and injuries.

There is need for adoption and understanding of general rules and procedures upon which all upstream-downstream

PACIFIC NORTHWEST AREA ELECTRIC UTILITY LOADS

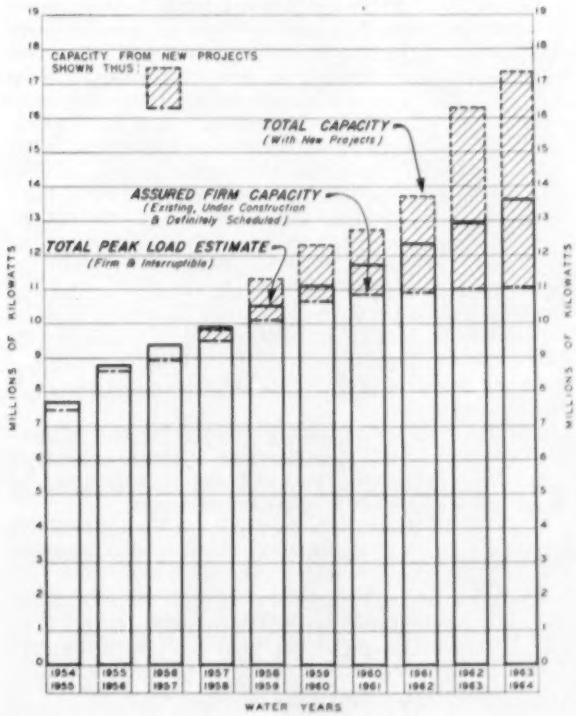
ACTUAL: 1920 TO 1953 INCLUSIVE
ESTIMATED: 1954 TO 1964 INCLUSIVE



PACIFIC NORTHWEST AREA

COMPARISON OF TOTAL ESTIMATED LOAD TO TOTAL RESOURCES WITH PARTNERSHIP PROPOSALS

CRITICAL WATER CONDITION


CAPACITY FROM NEW PROJECTS SHOWN THUS:
TOTAL CAPACITY
(With New Projects)
ASSURED FIRM CAPACITY
(Existing, Under Construction & Definitely Scheduled)
TOTAL PEAK LOAD ESTIMATE
(Firm & Interruptible)
MILLIONS OF KILOWATTS
1954 1955 1956 1957 1958 1959 1960 1961 1962 1963
1955 1956 1957 1958 1959 1960 1961 1962 1963 1964
WATER YEARS

relations may be based. Such rules and procedures are essential in order that the costs, the values and the uses of future hydro projects may be predicted with some degree of certainty. Such predictability is essential to stabilize the bases for investment in future developments. This general problem applies to interproject, interstate and international situations where power waters flow from one project to another.

Elements of this upstream-downstream matter are the crucial considerations that are currently delaying the building of the Libby project. The same considerations will be important to other future projects. The Federal Power Commission, the Governors' Engineering Committee, Canadian groups and others are now trying to enunciate clearly an equitable set of upstream-downstream principles and procedures. Progress is being made, but a definite date for emergence of a workable general solution for these matters is not foreseeable at this time.

Adequacy of Resources

Consider the adequacy of resources. Firm capability of all existing resources this 1954-55 year is about 7,500,000 kw. Those same resources have a capability exceeding 8,000,000 kw with median water supply. In the current operating year the resources were substantially equal to the requirement for firm loads and with a water supply that has been better than critical. Interruptible loads totaling about 450,000 kw have been carried except for a short period when a small part of this load elected not to purchase available steam power. From this starting point, it can be seen that loads and resources are substantially in balance. Thus the problem of an adequate future power supply resolves itself to one of providing new resources at about the same rate as load grows. The average rate of growth from 1920 to 1954 was 7.39% per year. The increase in January 1955 over January 1954 was 590,000 kw or about 8.25%.

Load estimates made by individual systems indicated that the total requirement, six years hence, in January of 1960-61, will be 11,750,000 kw, which is 4,000,000 kw above this year's load. By January 1964 the load will be 13,550,000 kw, which is 5,800,000 kw in excess of the present load. This estimated growth to January 1964 is at an average rate of 6.62% per year. Consensus of the engineers is that this estimate is conservative. They have agreed to refer to it as being an estimate of minimum loads for planning purposes. Both the historical data and the estimates referred to include interruptible loads in the area.

New Projects

At present, there are new projects under construction and definitely scheduled that will be able to produce about 3,600,000 kw by 1963-64. The schedule for bringing these projects in is such that it will closely follow the estimated loads for the next five years, through 1959-60. But these additions will not be adequate to carry estimated growth for 1960-61 and onward. (In order to assure carrying all loads in 1960-61, about 880,000 kw more of new capacity will be required in excess of that which is now under construction.)

By 1963-64 the requirement for additional resources, beyond those now under construction, will have risen to 2,560,000 kw. These data have prompted the engineering committee of the governors' policy group to report that, by usual standards, the outlook for power supply is good for the next five years, through 1959-60. But they also hasten to point out that this situation, in itself, does not sufficiently

cover the resource outlook for 1960-61 and later period.

The Northwest has become accustomed to dependence upon hydro sources for its principal power supply. An inherent characteristic of hydro projects is that they require long periods of time for planning and construction. Analyses indicate that the projects, which are actively under consideration, require an average of five years from start to finish of construction and that one or two preceding years are required for planning and design. It is apparent then that, with 1960-61 less than six years in the future, there is no time to waste if requirements then and later are to be met by new hydro developments.

Potential Projects

Summaries of potential projects for future development provided a list of 70 sites that might be brought into production by 1964. Some of those proposals are for overlapping sites but they would have installed capacity in the range between 11,500,000 kw and 12,600,000 kw and might develop up to 32,000,000 acre-ft of storage.

Agencies and utilities that finance power project construction have proposed and have expressed a willingness to undertake development of 36 of the 70 suggested projects. Those 36 could add 6,700,000 kw of dependable capacity by 1963-64. These data seem to make it amply clear that the potential, desire and willingness to build an adequate power supply are to be found among those agencies who have the responsibilities to fill the need.

The comparison of estimated loads and resources showed that 1960-61 is the first year in which a serious deficiency is indicated. A review of proposed projects shows that 20 or more of the developments that builders are willing to undertake could be in production before 1961. These 20 projects might provide in excess of 3,000,000 new kilowatts for the 1960-61 situation. But out of that group of 20 there are only five, namely, Noxon Rapids, Mayfield, Mossy Rock, Upper Baker and the south fork of the Skokomish that are currently advancing on a schedule that would help to remedy the 1960-61 requirement. All of these five projects are going forward but none of them is yet completely in the clear for actual construction. However, if they do continue as planned, these five will be producing about 580,000 kw by 1960-61, leaving a further requirement for 300,000 kw in 1960-61. If as little as 15% of the remaining proposals can be cleared within a year from now, that could take care of the 1960-61 situation. In addition to the five projects that are proceeding, about 1,960,000 kw additional will be required to meet the 1964 situation.

Fuel Power

Northwest engineers have not been unmindful that fuel power additions will offer an effective and economically sound assist in meeting future needs for new power. Certainly, a long-range view cannot ignore a major future dependence upon atomic and fossil fuel power sources. There is the impression in some quarters that additions of new fuel power are economically justified at the present time. But appurtenant analytical, policy and public relation matters need to be resolved.

The technical and engineering aspects of combining fuel and hydro power are not new. They have been reasonably well understood for some time. But it is necessary to reassess repeatedly these features in the light of ever-changing conditions and foreseeable trends for the future. The continuing trend of increasing costs for new hydro power and decreasing costs for new fuel power are hastening the day when major additions of new fuel power will be an economic necessity in the region of the Pacific Northwest.

Aside from technical and economic considerations, the fuel-power problem is encumbered by matters that are basically in the fields of accounting, rate making and public relations. These matters came into critical focus a few years ago when it was necessary to impose surcharges on some Northwest power consumers to support steam operation during a time of low water flow. The resultant bad publicity did considerable harm to the case for acceptance of new fuel power. That experience has prompted the suggestion that a cure should be devised by spreading the base upon which those charges are made by utilizing financial reserves established to even out the impact feature of irregular fuel costs. In any event, the fact must be recognized that from year to year wide swings in generation from fuel will be unavoidable. This will be true so long as fossil fuel power is a substantial but not a predominant part of Northwest power supply. It is necessary to recognize that troublesome irregular demands for fuel consumption do not necessarily weaken the soundness of combining fuel and hydro power resources.

Another aspect in the new fuel-power problem has to do with the relative position which interruptible loads, consuming secondary hydro power, should have in relation to the alternative possibility of using that same secondary hydro power with fuel power to support firm loads. Spreading and leveling the impacts of fuel consumption and the relative merits of interruptible loads vs additional fuel-hydro firm supply, both must ultimately be solved on policy levels. Engineers are undertaking to supply the basic information that can be useful in developing proper policies.

All these studies of matters relating to new fuel power are efforts to prepare the way for ready acceptance of atomic and fossil fuel power when fundamental economic advantages of their addition to the area power supply can be demonstrated.

Summary

Electric loads in the Northwest historically have grown at a rate exceeding 7% per year over the past 34 years. Available estimates indicate future growth will follow that approximate trend through the next 10 years. At present firm capability of available resources is substantially equal to load requirements. New resources, under construction and definitely scheduled, will add about 3,500,000 kw. The schedule for bringing in this construction program will increase the area's capability to about 10,900,000 kw in 1960-61. By that time, the load will require another 880,000 kw from power developments that are not currently assured. Projects that can add about 580,000 kw by 1960-61 are proceeding along a planned schedule, but their actual construction has not yet started. Proposals have been made by responsible companies and agencies that could provide 3,000,000 kw from new starts by 1960-61 but those projects are being delayed—primarily by problems other than engineering and finance.

Efforts are being directed toward resolving general problems that are subject to engineering evaluation. Many of these are very complex and will require some time for development of generally acceptable solutions.

If we can be about 15% effective in solving our problems within the next year, we will be on the track of an adequate future power supply.

The writer has discussed the Northwest power situation with permission of the engineering committee of the Governors' Policy Committee, but that permission does not carry authority to enunciate official or binding conclusions for the engineers or the parent policy group.

Although unguyed lines parallel to shock wave of 35-kiloton bomb went down, Operation Cue gave valuable evidence of . . .

How Power System Withstands Atom Blast

Electrical lines and equipment installed in "survival city," 4,700 ft from ground zero, came through the 35-kiloton A-blast on the Nevada desert May 6 with much less damage than could have been expected. The fact that houses and industrial-type buildings at 4,700 ft from ground zero were either reduced to rubble or very badly damaged makes the performance of the electrical facilities the more remarkable.

Although four out of 15 poles were blown over by the blast, a light steel transmission tower was knocked down and transformers were blown off of poles, a typical substation and some other equipment came through practically unscathed. It is estimated that service could have been restored within eight hours under actual bombing if there had been anyone left to require service.

An electrical engineer-observer is of the opinion that had this been a built-up urban community there probably

Right, top: This two-story frame house, 4,700 ft from ground zero, was a shambles but two earthquake-resistant houses only lost doors and windows. At bottom: Digger truck crosswise to the blast was tipped over but the line truck only had hood, doors and windshield blown away. Both of the trucks appeared operable. Tools were undamaged

Insulation peeled off when secondaries whipped around street lighting standard

Lines stayed up but three 50-kva transformers were blasted from this two-pole platform

Heat wave made secondary insulation bubble but other gear on this pole was undamaged

would have been less damage because of attenuation of the shock wave as it passed over buildings. The point of equal damage would simply have been moved closer to ground zero.

Extent of Facilities

There were two identical facilities—one at 4,700 ft and the other at 10,500 ft. The latter suffered no damage. Facilities consisted of 15 spans of typical distribution line carrying 11- and 4-kv primaries, open-wire and cabled secondaries, service drops and a street lighting circuit. There was one span of 69-kv steel-tower line, a distribution substation and a three-compartment meter-relay cabinet.

Wire sizes were: transmission, 600-ft span, 2/0 copper; 11-kv primary, 2/0 ACSR; 4-kv primary, 4/0 copper; 5-kv aerial cable, 2/0 copper spun on Copperweld messenger; secondary, No. 2 weatherproof aluminum on secondary racks. Lines ran transverse to the shock wave.

The Bechtel Corp. of San Francisco built both facilities to standards used by Southern California Edison Co.

Extent of Damage

Extent of damage was observed to be as follows:

The tangent light steel transmission tower was blown down. Leg members buckled near the ground on the side away from the blast. Failure occurred along a line of bolt holes.

Four of the 15 poles in the distribution line were knocked down. The worst of these, shown, was probably hit by flying debris from a completely demolished frame house on the blast side. Guyed poles survived better than unguyed installations.

Aerial cable was little damaged.

Three 50-kva platform-mounted transformers on a two-pole structure were blown off.

Pole-mounted 15-kva distribution transformer was knocked off and blown 35 ft from base of the pole. This pole was behind a two-story house that was totally destroyed.

Some crossarms were broken or split, again probably from flying debris.

A capacitor bank, steel pins and insulators showed no apparent damage except bent pins.

Racked secondaries were wrapped around street light standard, probably from flying debris.

Back panels of the relay cabinet were dished in and foundation uplifted; batteries were knocked off shelf and broken; only apparent damage to instruments was a broken glass cover.

Little damage was done to the substation. Top cabinet on one regulator had dished-in panels; regulators were slightly shifted; two leads were pulled from their connectors; a few structural members were slightly deformed.

One street light mast arm was bent but the glass was unbroken. Glassware of one luminaire fell to the ground in the direction of the blast, probably from negative pressure wave.

One of two line trucks was tipped on its side but there was little, if any, damage to the truck or tools. Windshields were completely shattered.

Heat from the blast was sufficient to boil out asphalt on No. 2 weatherproof wire.

As previously stated, it is estimated that electrical facilities could have been restored in eight hours.

Effects on Nonutility Facilities

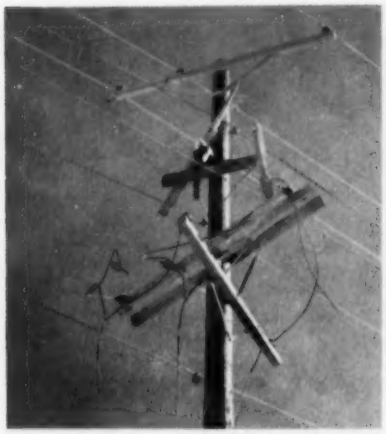
Damage to nonutility test facilities is enlightening. At the 4,700-ft line, typical two-story brick and one-story homes were totally destroyed. Two homes of reinforced construction had doors and windows blown in. A two-story redesigned frame house at 5,500 ft suffered severe damage and would not be suitable for use without extensive repairs. At 7,800 ft from ground zero a two-story redesigned house was damaged heavily but could be used as an emergency shelter after not-too-extensive repairs. Two homes at 10,500 ft were considerably damaged, while two others of reinforced construction had relatively minor damage. These two could be turned into emergency shelters at a reasonable cost.

Three types of light industrial buildings at 6,800 ft could not be used without extensive repairs or complete replacement. Three types of industrial buildings at the 15,000-ft line suffered damage ranging from severe to negligible, but could still provide shelter to interior contents. Earthquake resistant design showed remarkable little damage.

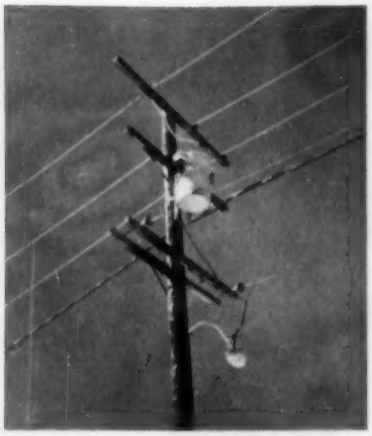
A few electrical appliances were installed in some of the houses. A refrigerator suffered a slightly dented side. However, the exterior enameled surface was badly scarred from particles of flying glass. A freezer lost its rubber seal around the complete lid, probably from the extreme pressure differentials. It was otherwise undamaged. A small 2-kw home light plant was operable immediately. All light bulbs were shattered. A radio transmitter in one of the less damaged houses was made ready for operation within half an hour.

Underground gas mains, equipment and instruments including those placed in manholes at 1,470 ft from ground zero were not noticeably damaged.

Operation Cue, as this blast test was called, was conducted jointly by the AEC, Federal Civil Defense Administration and the Department of Defense. EEI participated as the electrical industry representative.

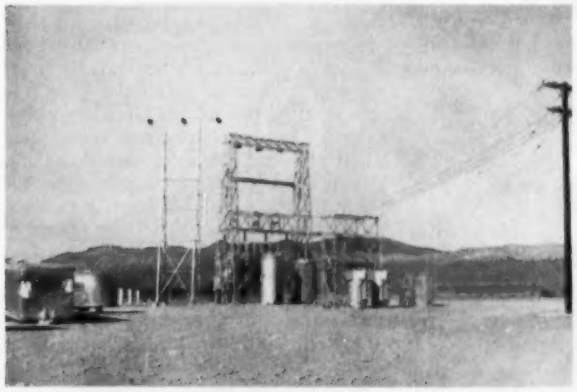


Flying debris from demolished house broke crossarms and wires on this pole structure

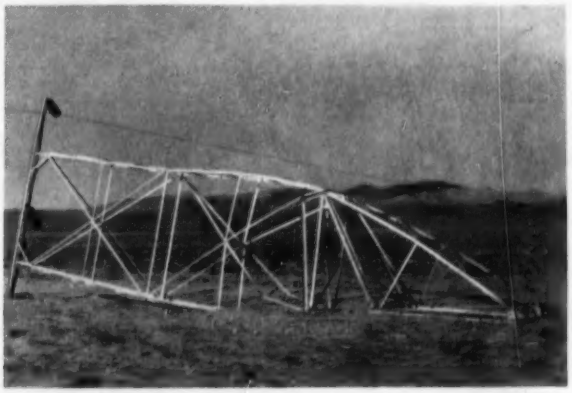


Bent street lighting arm, shifted transformer and split crossarm only damage here

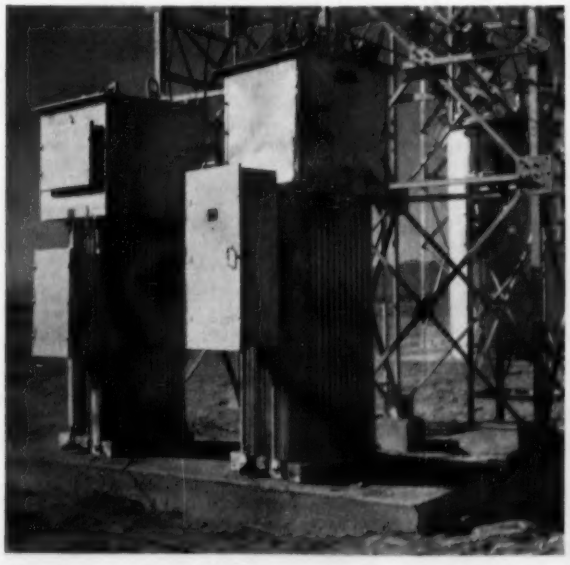
15-kva transformer was tossed 35 ft from this pole located 4,700 ft from ground zero



Standard substation 10,500 ft from blast was undamaged, two adjacent houses and parked trailers had all their windows demolished



Heavy steel tower stood up but light suspension structure 4,700 ft from blast buckled. It carried 600-ft span of 2/0 copper conductor



Regulators not bolted to foundation shifted slightly and housing of unit at right was dished and bent. Two leads were pulled loose

Substation instrument house received good shaking up even to lifted foundation. Batteries spilled and broke but instruments fared well

Utah IAEI Chairman M. W. Silver hands gavel to new chairman E. R. Anderson. Seated is L. M. Christensen, secretary. A. H. Bywater and W. T. Hawes are the new vice-chairmen

Inspectors Go It Alone

Without much outside help this year, annual meetings of the Nevada, Utah, Idaho and Montana Chapters of International Association of Electrical Inspectors were also held in late April and early May. All of them had one faithful helper and several topics in common. The man was Les B. Johnson, General Electric Co., Salt Lake City, who headed code discussion at each meeting. The one subject common to all was state legislation.

Nevada Chapter met at Ely April 22-24, presided over by Henry Etchemendy of Elko. Utah Chapter met in Salt Lake City April 25 with M. W. Silver of that city as chairman. The Idaho Chapter met in Boise April 28 under Don Baird, inspector of Caldwell, as chairman. Montana Chapter met in Missoula with W. F. Kinkade of that city as chairman on May 2-3. No national officers were able to be present this year. At Ely, President Ben Wheater and Secretary-treasurer Lou La Fehr of the Southwestern Section attended and H. G. Ufer, first vice-president of IAEI, now with Rome Cable Co. of Los Angeles, addressed both the Nevada and Utah Chapters on "The Electrical Inspector's Duties and Responsibilities."

State legislation for state inspection was a triumph in the Idaho meeting; a post mortem in the Nevada and Utah. With almost no opposition, the long-wanted amendment to the Idaho State electrical law permitting the charging of permit fees in order to finance inspection had only recently been passed. This gave new hope to the inspection picture throughout the state and proved the highlight of the meeting.

In Utah the bill, which had passed both senate and assembly, had been vetoed by the governor. In Nevada, H. W. Lindsey of Winnemucca reported on the fate of a bill submitted in that state's legislature, which died in committee without the sponsors being granted a hearing.

C. T. Brooke, Underwriters' Laboratories service engineer of Santa Clara, Calif., at Ely and L. B. Honnegger of UL at Salt Lake City followed up a talk on the UL history and development of standards with question periods. The most provoking one seemed to be the confusion over accepting the UL label from a component part, whereas the entire assembly might not be UL listed for the purpose to which it was to be put.

At Ely F. E. Walters, director of FHA, and at Salt Lake City, I. P. Dahl, director for Utah, discussed FHA standards for house wiring in the face of increasing uses of electrical appliances in the home.

An entertaining talk was given at Ely by Ted Libby of the Bell Telephone Co., who presented a humorous and nontechnical demonstration of the newly developed solar battery and transistors. A. E. Fleming, General Electric Supply Co., Salt Lake City, gave a humorous parody of code defi-

Nevada IAEI officers: M. E. Lundberg, Elko, H. W. Lindsey, Winnemucca, Charles LeClare, Reno, new chairman, W. W. Murdock, Elko, Francis Wells, Reno, Lynn Steiner, Ely, A. P. Gibson, Las Vegas, and Henry Etchemendy, Elko, the retiring IAEI chairman

nitions at both meetings and J. Hyde Stayner was praised for his assistance to the Nevada Chapter in its programming and organization. Floyd Shipp, manager, Utah-Idaho Chapter, NECA, addressed the Idaho Chapter meeting outlining the tremendous need for wiring being made by the volume sale of appliances.

Other speakers at the Idaho Chapter meeting were State Assemblyman Ralph Wickberg of Shoshone, Henry Faulkner, president of the Snake River Valley Electrical Assn., and John T. Kimball, vice-president and general manager, Idaho Power Co., who addressed the dinner session. At Salt Lake City J. E. Cushman, vice-president, Utah Power & Light Co., likewise addressed the dinner session.

Officers elected by the Nevada Chapter were Charles LeClare, city inspector, Reno, chairman; A. D. Gibson, engineer, Southern Nevada Power Co., Las Vegas, vice-chairman; and Francis Wells, Reno, secretary-treasurer. Prof. I. J. Sandorf, University of Nevada, Reno, was not present but was elected second vice-chairman. Members of the executive committee elected or re-elected were M. E. Lundberg, Elko-Lamoille Power Co., Howard W. Lindsey, California-Pacific Utilities Co., Winnemucca, Lynn Steiner, Ely Light & Power Co., Henry Etchemendy, Elko inspector, and R. L. Osborne Jr., wholesaler, Las Vegas and Reno.

Of the Utah Chapter, E. R. Anderson, Telluride Power Co., Richfield, was made chairman succeeding M. W. Silver of Salt Lake City; A. H. Bywater, chief engineer, Utah Fire Rating Bureau, first vice-chairman; William T. Hawes, Provo electrical inspector, second vice-chairman; and L. M. Christsensen, Salt Lake City inspector, re-elected secretary-treasurer.

Idaho Chapter officers will now be C. W. Davis, superintendent of light and power in Burley, succeeding Don Baird, city electrical inspector of Caldwell; Floyd Warner, superintendent, Lighthouse Electric Co., Kellogg, Idaho, vice-chairman for the first district; A. H. Gates, Mountain Home contractor, vice-chairman, second district; Harry Smock, inspector, Twin Falls, vice-chairman, third district; and S. N. Jeppeson, Teton Power Co., Driggs, vice-chairman, fourth district; Mark H. Lundy, Boise, state electrical inspector, was made secretary-treasurer. Executive committee members include Park Forte, Boise city inspector, and Hal E. Baker, state inspector at Lewiston.

Report has not been received of the Montana Chapter. Its small attendance gave rise to a question to whether to continue it unless greater interest is shown by the entire industry of that state.

Northwest IES Conference

Discusses Visual Comfort

Visual comfort, defined as the lack of annoyance in the environment illuminating engineers help to create, was the subject, directly or indirectly, of most of the papers and discussions at the Northwest Regional Conference of the Illuminating Engineering Society held at Harrison Hot Springs, B. C., April 25-27. In fact, one whole session of the meeting was devoted to a symposium on the subject of visual comfort.

Duncan M. Jones, national president, lent importance to the conference when he said that people of the chapters and their enthusiasm gave IES the views upon which the society goes forward. He dwelt on the functions and services of the IES and the need for additional services; stressed the need for more research; outlined an expanded public relations and information program; said it was a grave error for utilities to reduce or abandon their consulting service.

The VCI, visual comfort index, concept of assessing the effect of a lighting installation on people was presented by R. L. Oetting, General Electric Co., Nela Park. VCI is a number system by which an installation can be evaluated beforehand. It deals with human beings and their comfort. Comfort revolves very largely around direct glare, said Oetting. A number of methods for evaluating comfort are now being proposed, he said, but it is hoped that work now being done by the IES will reconcile all methods and provide the industry with a workable tool.

Matt Cabot, Western regional manager for Day-Brite, explained the Harrison-Meaker system by which comfort values can be determined before an installation is made. This system, he said, is a good tool for use in designing a job to predict direct glare. Anyone can use the system; it is simple and there are no mathematics, said Cabot.

Walter Potter, G-E, shows new light sources

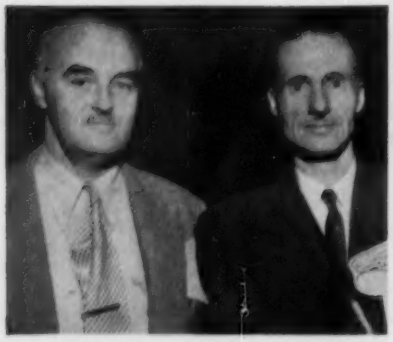
"Let's select from our lighting sources and use those that we can apply with comfort," said R. A. Yates, vice-president, Wakefield Lighting Ltd., London, Ontario. The luminous ceiling, he said, because of its large area and low brightness, is a good solution to visual comfort. Yates discussed the use of acoustical baffles and pointed out that they can reduce ceiling brightness ratio and add comfort, besides lending themselves to coordination with heating, air conditioning, sprinkler systems and movement of partitions.

Glass in its relation to comfort and its use to control light for comfort was discussed by A. R. Jaeger, illuminating engineer with Corning Glass Works, Corning, N. Y. He dealt with the manufacture of modern glass, its characteristics and use in lighting. Glass redirects and filters light, he said, and unfolds brightness over a larger area.

E. W. Beggs, manager, fluorescent and vapor lamps, Westinghouse, Bloomfield, N. J., discussed characteristics of existing light sources and traced developments to achieve comfort. We are taking over where daylight leaves off, he said. For ordinary use, Beggs feels that a good quality of white light is best. With the new semi-reflector color-corrected mercury lamp and the new de luxe fluorescent lamp, we have new tools for applying white light, said Beggs.

Light Sources

Dr. E. W. Lowry, manager of engineering laboratories, Lighting Division, Sylvania Electric Products Inc., Salem, Mass., discussed the fluorescent lamp, past, present and future. He said the longer the lamp the better the efficiency, but that the 8-ft lamp is the ultimate practical; that the 96-T12 lamp is the best lamp that can be made for maximum efficiency, both as to length and diameter of tube; spoke highly of the new super de luxe cool white lamp with its greatly improved red characteristics. Ballasts have kept pace with improved efficiency of lamps, he said, and within a few years all lamps will use the rapid start series sequence ballast. Lowry mentioned the trend toward newer, higher output lamps, such as the 96-T12, and said



Jones Doherty

Plowman Scott

Yates Oetting

Jaeger Beggs

Hollingsworth Hinkley

Smith Cabot

that by using a combination of argon and krypton gases at 1.5 mm an output of 7,000 lumens can be obtained, running at 100 w and operating at 825 ma. He brought the group up-to-date on the great progress made with the electroluminescent glass panel and predicted a great future for instrument panels, control panels, clocks and on walls where effect lighting is desired.

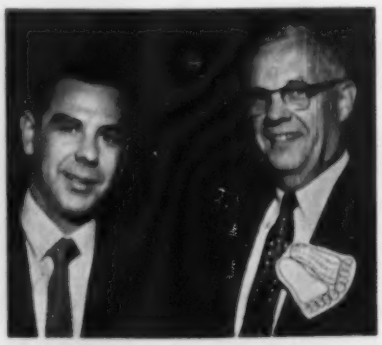
Walter Potter, Lamp Division, General Electric Co., Portland, gave a rapid-fire hour-and-a-half demonstration of new light sources and new luminaries at an evening meeting. Many interesting new deevlopments were revealed.

Bob Oetting said maintenance should be taken into consideration at the time of design. He said maintenance is a very practical problem and has not received the attention it should have had; that we should explore and increase our knowledge on atmospheric conditions, study the problem and build up information from field reports. He pointed out the advantages of group replacement by citing examples and giving costs.

Floodlighting was discussed by O. C. Westberg, manager, Pacific Coast Division, Benjamin Electric Mfg. Co., San Francisco. He said that floodlighting of buildings, if properly designed as to intensity, layout and in all respects, still offers great opportunities. Plenty of aids are available from manufacturers and he urged that floodlighting be used for longer hours to bring out architectural beauty and the beauties of nature to impress the public, particularly the tourist. Slides were used to demonstrate good and poor floodlighting of a building of modern architecture.

J. MacCarthy, B. C. Electric Co. Ltd., presented an instructive discussion, illustrated with slides, of the many uses of light on the farm and the great opportunities existing for greater use of light all the way from the cow barn to speeding the growth of plants and flowers.

Irving Smith, vice-president, Curtis Lighting of Canada, Toronto, showed lighting in 3-D. To an enthusiastic mixed audience, he projected some 50 slides in 3-D showing interesting lighting jobs from Montreal and Quebec to Vancouver and some spectacular scenery on the way. The showing demonstrated that 3-D can well be used as a new tool in selling lighting.



Racine Westberg

Presentation of winners from the five chapters comprising the Northwest Region in the "My Most Interesting Lighting Job" contest constituted a highlight of the conference. First place in the runoff went to Walter Lind, manager, G-E Lamp Division, Vancouver, for the lighting installation in the company's new Vancouver office-warehouse. Hence he will compete at the national convention. The judges awarded second place to B. T. Heinz of the Puget Sound Section for the lighting of the Lynnwood school and third place went to John W. Adams, Inland Empire Section, for the lighting of a sheet metal shop. The other two contestants were Frank Reis of the Oregon Section and Kenneth Reid, Vancouver Island Section, for the relighting of an executive's office and supplementary lighting for a business street, respectively.

Conference committee chairmen were: general chairman, Bob Scott; finance, Doug Gordon; registration, Ernie Thompson; transportation, Eric Ackland; publicity, Brett Manlove; and members-at-large, Walter Lind and Tom Doherty.

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Business ahead

There's a boom on, says Business Week, and reports from contractors about business in various parts of the West generally verify it. Residential building continues to grow amazingly and business and industry is expanding, calling for electrical work. The plans are coming from the drafting boards to the bidders—more than plenty on each job, however. It looks like a busy fall but profits may be scarce.

Last one

Convention season ends in June with the National Industrial Service Assn., the motor shop and industrial electrical contractor group, meeting at the Statler, Los Angeles, June 6-9. Motor shop operators from the Western chapters planned attendance in numbers.

Fishing season

Nationally it is the strike or threat-of-strike season—in trucking, autos and sundry. But the electrical contracting business has saved itself again by a familiar process—"Gripe like the devil but give them what they want." Union wage rates will increase all over the West except in Boise as a result of the spring fever of negotiations.

Surprise

"California has done it to us again," said contractors from the Pacific Northwest and mountain states on hearing of the decision on the Oakland case taken to the Council on Industrial Relations. Californians felt, however, that it marked a reverse trend in council decisions in that it decided on a 5c per hour increase and a better travel-zone arrangement asked by the contractors rather than the union's higher demands.

Up the ante

Meanwhile, Bay Area contractors' groups waited for the Oakland decision, then followed San Jose's lead of 7½c per hour increase now and 5c Jan. 1 for a two-year contract. San Mateo and San Francisco followed suit on the deadline, thus putting Oakland in unbalance, which may lead to higher demands "to compensate" next year. Sacramento had increased 12½c. "Protection" on work in progress was obtained in San Jose and asked for in San Francisco and San Mateo.

Forgotten man

Not once was a voice raised for "protection" for the customer in all of the negotiations. Everyone is "protected" except those expected to pay for it all. One of these days it may be the customers who go on strike.

Epidemic

Justification for the raises was said to be that the plumbers scale had been increased 30c an hour in Fresno and similar raises in northern California were pending. AGC had recently given a blanket increase of 10c to all carpenter and related crafts.

High points

Returning Westerners who attended the NAED annual convention at Chicago report a strong interest in promotion of electric heating, a protest to the manufacturers over change-the-cash-discount practices, support of the federal construction contract act (SB1644) being fought for by the National Electrical Contractors Assn., and re-election of Lester E. Barrett as president. He was a visitor to San Francisco during the NAED zone convention last fall.

Laws in process

Important legislation for segregated bidding was being considered both by Congress and by the California Legislature at press time. NECA's bill for federal construction was before the Senate judiciary special committee and the prospect looked favorable. However, AGC and certain government agencies are fighting it bitterly . . . In California AB2074 for amending the subbidders' listing law has passed the assembly and been approved by the senate governmental efficiency committee. It had a couple more committees to go before, prior to reaching the floor for a vote . . . AB1670 which put limits on home owners doing their own work to the premises in which they themselves live was passed by the California Legislature and signed by the governor May 25.

Big event

National Electrical Contractors Assn.'s Districts 6 and 8 combined meeting in San Francisco May 26-28, with 160 contractors and managers attending, represented most of the chapters in the two Western regions. Vice-presidents W. R. Grasle of Portland and W. P. Robbins of Salt Lake City took turns presiding over general sessions. There were separate breakfast meetings of chapter groups and of the districts on Friday, and on line constructors and the codes and standards committee on Saturday. Detailed report will have to wait until next issue.

Aired views

Labor relations workshop, initiated last year at Reno's NECA conference, again proved a popular outlet for the members' discussion of labor troubles. The group voted support of the Davis-Bacon Act proposed amendments and turned down all but one of the proposed Taft-Hartley Act amendments. Ten suggested changes to the benefit agreement for pensions with IBEW were read by Paul Geary, executive vice-president, NECA, Washington, D. C., and discussed at the District 8 meeting.

Be it resolved

Resolutions included one to have NECA explore the feasibility of mass-purchasing power to establish a central national purchasing office through which contractors may buy at the best prices. This was felt necessary because of credit and bid-price-cutting practices among suppliers that place contractors at a disadvantage, particularly in reselling to industrials . . . Another resolution asked that more work be done to sell large general contractors with IO agreements on subcontracting electrical work.

Pay up

IBEW will not sign any new changes in agreement until all contractors who employ IBEW electricians in the area are paid up on the pension fund, Oscar Harbak, IBEW District 9 vice-president, announced. This will apply both to NECA members and other employers. Just who will be charged with this certification and collection was not clear.

Back in business

So quietly that the industry could hardly believe it, an amendment was passed by the Idaho State Legislature that will allow the state electrical inspector to charge permit fees for inspection and thus help finance a few state inspectors again. J. Carl Baldridge, state chief inspector, says the staff will be increased to five inspectors as qualified men can be found and the permit system is established.

Expands

Afton-Lemp Electric Co., wholesale distributor of electrical supplies, Boise, recently moved to a 20,000-sq-ft new office and warehouse building at 620 Ninth St. A basement auditorium will be finished later for sales meetings and appliance display, according to Joe Wright, manager.

More wage scales

Results of wage negotiations in the Mountain States included a two-year line agreement in Utah with Local 57 for a 5c increase now, to $2.85, and another 5c next year . . . In Boise Local 291 did not ask to reopen the agreement, being content to hold the present scale . . . At Twin Falls 25c was asked but the local settled for 15c now and a 10c increase next year on a two-year contract. That will then bring the scale to $2.75 . . . At Pocatello and Idaho Falls the union threw the book at the contractors who refused to budge and Local 449 took the case to the council for a 10c increase. Council decision has not yet been announced. The committees had reached an agreement but the membership rejected it. Practically all line work in Idaho is now nonunion and in Utah the right-to-work bill went into effect May 11, which would make closed shop illegal . . . At Billings, Mont., 26c an hour was given, 10c of it a net increase, the rest to replace a former vacation plan of 5c and travel clauses equivalent to another 10 . . . At Kalispell a case was taken to the council.

Business and fun

Rocky Mountain Chapter, NECA, holds its annual summer conference June 10-11 at Saratoga Inn, Wyo., where about 100, including wives and children, are expected. The one-day business session will consider a home modernization program, a state-wide bid depository modeled on the one in operation in Denver at present, according to Don Larson, manager.

Holiday

Utah-Idaho Chapter, NECA, plans its semiannual chapter meeting at Sun Valley Lodge over the Labor Day holiday, Sept. 3-5. It will be similar in character to the spring meeting in March in Salt Lake City, at which representatives of all divisions attended.

Costs considered

E. R. "Al" Cornish, research and education director, NECA, Washington, D. C., addressed a joint electrical industry luncheon May 23 in Denver, at which Don M. Larson, Rocky Mountain Chapter, NECA, manager, was chairman of the day. The meeting was sponsored by Rocky Mountain Electrical League and had a panel consisting of Roy O'Donnell, representing suppliers, Harold Risley, utilities, Bert Stiles, electrical contractors, Sam Neely, dealer, and Lou Goalby, manufacturers . . . Cornish also recently came to the Montana Chapter annual meeting in April, addressing it on estimating procedures.

Goes south

International Association of Electrical Inspectors, Southwestern Section, executive committee voted in favor of Bakersfield transferring to the Southern California Chapter from the Central California Chapter, requested by P. L. White of Bakersfield and R. G. Paulson of Kern County. It also authorized Secretary-treasurer L. E. LaFehr to attend the IAEI executive council meeting and concurrent NFPA meeting at Cincinnati May 15-20.

Curve

Half-circle fluorescent lamps seem to be available, according to a photograph recently released by Westinghouse Lamp Division. Circline, full circle, lamps have been available for some time but half-circles seem to be new.

100-amp

Cheyenne has increased its minimum requirements for residential service entrance to 100 amp for all but very small houses. Spokane's 200-amp meter socket and 1½-in. conduit to provide for 200 amp capacity is attracting nation-wide attention.

Will take it

Underwriters' Laboratories has announced the listing of general use snap switches, labeled "AC," that have been tested for controlling resistive, inductive, fluorescent lamp, and tungsten filament loads up to the full current rating of the switch and for motor loads up to 80% of the ampere rating. Included are some approved for 277-v a-c switching.

Sad note

Several old-timers, and some not so old, died within the past month. James Dixon, former superintendent and city inspector for the city of Santa Clara, died in May . . . George H. Fitschen, also retired inspector, died of a heart attack while driving his car in Berkeley early in May . . . In Seattle, Patrick Joseph Givnan Sr., 87 years of age, founder of an electric supply and contracting business, died in late April . . . Bert Cole, Graybar's Fresno branch manager, only 51, died of a heart attack May 18 . . . Clinton W. Smith, Santa Barbara electrical contractor, was killed in an automobile accident near El Centro May 7 . . . Ralph Crump, electrical engineer at UCLA, prominent in IES and PCEA lighting activities, died of cancer late in April.

Had you heard?

Of people and companies—Osborne Electric Supply Co., Inc., opened its new building at 835 W. Bonanza Road, Las Vegas, and announced open house for June 4 . . . William Sroufe, long associated with Grover Burke of City Electric & Fixture Co., Seattle, together with Kline Blakney purchased the Lindberg Electric Co. at 4600 Leary Way, Seattle, a commercial and residential contracting business . . . John Names, formerly with Jones Electric, San Leandro, together with Frederick W. Woodword formed a new contracting company, Names & Woodward at 539 Claire St., Hayward . . . Paul Heydon, formerly of Spokane, is regional sales manager for Glassheat, made by Continental Radiant Glass Heating Corp. of New York. He makes his office at 530 Olympic Place, Seattle . . . Pacific Electric Motor Co., Oakland, announces that James W. Allen has been made manager of repairs and fabrication and William J. Larsen remains shop superintendent in charge of repair activities . . . Clem Smoot, who has been district manager for Smoot-Holman Co. in the San Francisco area, has gone back to the factory at Inglewood to become assistant to Leonard Hobbs, vice-president in charge of sales . . . John Ormond, former PG and E lighting engineer, has become a manufacturer's representative with office at 2519 Seventh Ave., Oakland . . . It's news in Idaho that William Hopper, Gem State Electric Co. of Boise, has decided to become a member of NECA, something of a tribute to Floyd Shipp, manager of the Utah-Idaho Chapter. . . . Hugh X. Sheeter is now exclusive southern California and Arizona representative of Howarduct underfloor wiring systems, made by Howard Electric Co.

Lifted

From "Scuttlebutt" of Southern California Section, IES, this news—Harry Marsh, formerly with Supreme Lighting Co., is now with Light Control Co., Los Angeles . . . Paul Hart has joined the power sales engineering staff of

the Department of Water & Power . . . Ralph Maassen, former member of the British IES in London, is now with Globe Lighting Co. . . Joe Newman has purchased the American Lighting Equipment Co.

More changes

Some manufacturer news—F. W. Wakefield Brass Co. will hereafter be shortened to the Wakefield Co. The announcement says that the word brass has been misleading since modern lighting fixtures use many other materials . . . W. W. Grainger Co., wholesaler of motors, established its 57th branch at 144 W. Market St., in San Diego, with R. H. Ferguson, former national sales manager, retired, in charge . . . O. Z. Electrical Mfg. Co. of Brooklyn, N. Y., has opened a warehouse and small manufacturing plant at 501 Indiana St., San Francisco, to stock its standard conduit fittings. The manufacturing operation is to provide custom-tailored fittings for contractors with special problems. Eichorn and Melchoir remain the manufacturer's representative of this line.

Demand the work

Luminous ceilings became the subject of directives from local union business managers and the international office in San Francisco. The IBEW claims full jurisdiction for the installation, not only of the lighting strips but the hanging of rails, supports, trim and installation of the diffusion plastics. Notices were sent to electrical contractors to that effect in May. O. E. Reiman repeated the injunction to the NECA Districts 6 and 8 meeting, ending with a strong sales pitch, urging electrical contractors to get busy and sell this type of area lighting so they can keep the business in their craft. He sounded like a sales manager as he told contractors to "get out there and sell."

School clinic

The luminous ceiling was made the subject of a special joint IES meeting of San Jose Chapter and Northern California Section at Stanford University late in April. After visiting Dr. J. B. McConnel's school plant planning laboratory, the combined group heard Dr. Charles Bursch, director of schoolhouse planning, State of California, give some pretty straight talk about natural lighting, artificial lighting and luminous ceilings. He declared there is no evidence scientifically that controlled skylights or luminous ceilings are any better than any other method, daylight or artificial, so far. The panel of architects and engineers included Mario J. Ciampi, Donald Beach Kirby, Charles F. Matson, Ralph B. Priestley, John Carl Warnecke, Harold Wright and Dr. Leland Brown.

Cool in Colorado

Window air conditioners are to be installed in all of its offices on four floors of the Gas and Electric Building by Public Service Co. of Colorado. Sturgeon Electric Co. is doing the rewiring necessary to carry this increased load.

Show place

A model electric home, sponsored by the Intermountain Electrical Assn., Salt Lake City, closed a 10-day open house run from May 22-31. The home was built by a local builder and wired by Jack C. Jacobs, Apex Electric Co. A de luxe wiring job with G-E low-voltage control on lighting was designed by Les Johnson of G-E. The house had a 200-amp main service, was equipped with glass heat in bathroom and kitchen, was adequate-wiring certified and light conditioned. General Electric colored appliances and cabinets were installed in kitchen and laundry. The IEA furnished a brochure and guides to point out the electrical features to more than 5,000 visiting the home.

Reasons why

Dun & Bradstreet's recent report says more contractors failed last year—a total of 1,305 leaving $56,000,000 in debts, 27% over 1953 in number and 31% in liabilities. Looking into causes, only 10% could be traced to neglect, disaster or fraud. Four major causes were lack of experience, managerial ability, and lacking of rounded sales, finance, purchasing and production ability. There were 49.3% downright incompetent.

Results count

Financed wiring has paid off on 401 residential customer accounts for Portland General Electric Co., according to a check test on January 1954 usage as against 1955. The average customer increase was 487 new kwh or 100% over the same month last year.

Trial installation

High-frequency fluorescent lighting, long talked of in theory, is soon to be tried by General Electric Co. in a Schnectady college installation. Some 500 eight-foot slimlines will be operated at 400 cycles, derived from two 30-kw rotating-type G-E package-unit frequency converters.

ELECTRICAL WEST Sales Guide

News Letter

June 1955

FOR THE ELECTRICAL MERCHANT OF THE WEST

As might be expected, advance reports on appliance showings at the Western Summer Market in San Francisco, July 18-22, indicate increased use of color--inside of refrigerators; on trims for ranges, dryers and air conditioners--and better color coordination for exteriors. Improved workability, more convenient placement of controls and lower price on color are promised for TV. Other things in prospect: More hi-fi package sets; more automatic clothes dryers, clock timers for appliances, rolling shelves for refrigerators. In small appliances there will be improved timers on rotisseries, temperature gages for broilers and coffee makers. A new electric pressure pan is expected to be ready for the show. In lamps, a new electronic switch will be incorporated by several firms exhibiting. . . Taking the place of the trade dinner for this market only will be a Radio-TV and Major Appliance Industry reception and cocktail party on July 20. Northern California Electrical Bureau is one of the sponsors; manufacturers, distributors and representatives serving the industry will be hosts.

Coming for Summer Market

With two months to go before the August gift shows, Western Merchandise Exhibitors Assn. reported that space reservations were 15% ahead of last year. Shows are scheduled for: San Francisco, Aug. 3-7; Seattle, Aug. 14-17; Portland, Aug. 21-24; Spokane, Aug. 28-30.

More reservations

New trends in lamps--picture window lamps; pin-ups that can be turned upside down for more indirect lighting; influence of Japanese and Italian styling; more outdoor lamps and torches were some of the new things promised for the California Lamp and Picture Show to be sponsored by Los Angeles Trade Fair Inc., July 10-14.

Lamp trends

Reports from recent home shows indicate that dealers are making sales and building up prospect lists from their display booths. Sacramento's Home Show, May 19-22, was no exception. As elsewhere a substantial number of prospects were asking about complete kitchens. G-E's wall refrigerator was a big attraction and so were other built-ins and colored appliances. Good crowds visited the 4-H Club booth and SMUD's exhibit, which featured appliances and cooking demonstrations, with snacks for all comers. Warm weather pointed up the advantages of air conditioning, which was well displayed. Special trade-in allowances were being offered by several of the dealers on some items. Many prizes were offered in addition to the electric range contest, which was moved to Memorial Auditorium for the show. This contest, which offers 16 ranges for completing the sentence "I want an electric range because. ." was receiving entries at about 30% above last year.

Nets prospects

Strong participation in the Home Show, June 15-19, in Boise will be taken by the Snake River Valley Electrical Assn., which hopes to make it principally an electrical show. Show committee includes Henry Faulkner, president, from Wesco; James Bruce, Idaho Power Co.; Pat Powell of Sure Appliance; and Vic Goertzen, association manager. Goertzen reports the organization of an electronics division for the servicemen's group of about 20. — Show at Boise

Atoms at Work, showing the peacetime uses of atomic energy and its by-products and the Westinghouse atomic power plant model are added attractions announced for the Greater Bay Area Exposition of Modern Living, Oct. 1-9 in Oakland. Displays in the Auditorium and Exposition building will include kitchens, appliances, electric housewares and tools, TV, radio and hi-fi. Cooking schools and demonstrations will be held in the Theater. Sponsors are the Northern California Electrical Bureau and the Gas Appliance Society of California. — and at Oakland

The third annual San Fernando Valley Air Conditioning Exhibit is being held June 1-July 31 at the Los Angeles Department of Water & Power's North Hollywood office. Sponsored by the Electric League of Los Angeles, the department and some 18 distributors, the show will include room air conditioning units, some models of central-type reverse cycle heating-cooling units and add-on cooling units for central heating furnaces. A display of built-in electric equipment is an additional feature this year. Department representatives will demonstrate the equipment. Open house programs are being arranged with building industry organizations for special evening programs. — Summer Exhibit

Ray Jones of Denver, leader in the Appliance Parts Jobbers Assn., was honored twice at the first national convention of the group held in the West in Denver May 20. He was presented an "Oscar" and a plaque for his leadership in setting up an appliance servicemen's training program in Denver that the APJA came West to see and to learn how to imitate. — Honored

An auditorium and kitchen, which can be used for dealer showings of appliances, will be a feature of the new office building being erected by Provo, Utah, Department of Utilities near its steam plant. A full-time home economist will be employed when the utility moves into its new facilities. — Kitchen for utility

National Housewares Directory, published by the Associated Pot & Kettle Clubs of America, is soon to be issued, according to James H. Dissman, chairman of the committee this year. Copies may be obtained at P&K headquarters, 1355 Market St., San Francisco. It will list 7,000 manufacturers, 14,000 trade names and 1,800 product headings. — Directory

Rocky Mountain Electrical League's dryer promotion wound up last month with a stag party for dealer salesmen who sold one dryer or more during the three-month campaign. Distributors gave the party and contributed prizes, with $500 in bogus money going to salesmen for each sale reported. More than 200 attended the party; 700 dryers, electric and gas, were sold, 2½ times last year's record. Next RMEL promotion is for air conditioning. A feature will be a temperature guessing contest, with entry forms to be deposited in person at dealer stores. Distributors taking part will conduct their own contests among dealers, furnish air conditioners as prizes. — League promotion

Poster reminders that "a modern air conditioner takes the Simmer out of Summer" were used as part of PG and E's promotion of this equipment. Dealer displays were set up in PG and E air-conditioned offices. — Cooler summer

Tract kitchens electric

Southern California Edison reports that building contractors plan to construct more than 90,000 residential units in its territory during 1955. At the end of April, Edison had received requests for service from tract builders for 7,141 ranges, 5,685 refrigerators, 5,755 dishwashers, 5,272 waste disposers, 4,419 automatic washers, 4,322 clothes dryers, 5,276 bathroom heaters, 1,638 water heaters, 481 heat pumps. Among recent developments with all-electric kitchens are the Katella Park Homes in Garden Grove, 350 homes, and the Trudy Richards tract in West Covina, where 200 homes were sold in three weeks. Both featured colored appliances, built-ins.

It's ALL Electric

Also in Edison territory and to be displayed during the EEI convention this month is the world's first all-electric community, a 431-home project developed by Kusa Inc. at Fullerton. No combustible fuels are used anywhere in this development. Heat pumps will provide air conditioning in summer, heating in winter; kitchens are all-electric; lighting is remote controlled. All electrical equipment will be included in the purchase price, which ranges from $16,500 to $21,500.

Summer attack

Operation North Pole, June through August, pushes food freezers, refrigerators and air conditioners in territory served by El Paso Electric Co.; offers dealer salesmen opportunity and incentive to advance from buck private to five-star general in the army of the Reddy States of America.

Scrapped

Dealers had turned in 450 old ranges and 264 old water heaters at the half-way mark in the campaign sponsored by Utah Power & Light, Western Colorado Power, IEA and electric dealers. Increased sales in other lines also were attributed to the promotion.

Buy out ball park

More than 13,000 saw baseball games between the Phoenix Stars and Mexicali Eagles as guests of AMA dealers on May 17-19. AMA bought out the park at Phoenix except for previously reserved seats and boxes; distributed tickets at 3¢ each among 57 dealer stores; underwrote nine door prizes of electrical equipment. Those wanting tickets had to pick them up from cooperating dealers.

Wiring promotion

A wiring modernization promotion in the Sacramento area will be pitched on the fact that "you can now modernize your home wiring with no down payment and as long as 36 months to pay." The promotion also will point out that appliances and wiring may be purchased on the same contract. Sacramento Municipal Utility District will run advertising and distribute a folder; electrical contractors and appliance dealers will cooperate by displaying proofs of the ads and window posters and passing out folders.

Also at Las Vegas

Southern Nevada Power is cooperating with electrical contractors and a major wholesaler in the Las Vegas area to promote adequate wiring. All customers will be circularized three times during a one-year promotion. First circulars went into the mail June 1.

To push water heaters

Idaho Power Co. is about to release a new water heater replacement program that will involve bonuses to plumbers and dealers. Details will be available soon. . . Pocatello district leads in sales in Idaho Power company's contest with 117% of quota for the dryer campaign.

Report sales

Electrical dealers in the Sierra Pacific Power territory have reported four-month sales of 417 ranges, 333 water heaters, 617 refrigerators and freezers, 36 space heaters and 23 installations of air conditioning equipment totaling 145 hp.

What's new

Among new products: Hotpoint is testing a water heater that uses the heat pump principle. A small compressor and evaporator extract heat from the air and transfer it to a water storage tank. . . Westinghouse has been showing its new line of built-ins and colored appliances. . . Thermador is offering a larger built-in oven, 18-in. high, 18-in. wide and almost 20-in. deep. Its built-ins now come in color. . . RCA has announced development of a refrigerator with electronic cooling mechanism. . . Motorola has a new portable radio, the Star Sapphire.

More to come

G-E President Ralph J. Cordiner, who started his career in the Northwest, selling appliances, was a Western visitor last month; pointed to some of the prospects for improvement in the American home. G-E expects to install about 750,000 Weathertron heat pumps in homes by 1965, he said; an electronic oven which can cook a 15-lb turkey in 45 minutes will be placed on the market next year; a cordless electric clock that will employ an electronic circuit to extract electrical impulses from the air has been designed.

Changes

W. J. Lancaster Co. expects to occupy its new building and warehouse by fall. The $300,000 structure at Third and Army in San Francisco will have 41,000 sq ft of floor space. . . San Diego Appliance Distributors Inc. has added the Amana freezer line. . . Ry-Bar Distributing Co. of Portland has been made a full-line distributor for Apex. . . Electric Distributors Ltd. is opening a new Kapiolani store in Hawaii.

About people

John R. Wing has set up a firm under his name as distributor in northern California and Nevada for Dishmaster, made by Gerity-Michigan Corp. The Wing Co. is at 1930 W St., Sacramento. . . Russ Ekrut, formerly of Whirlpool Co., has joined the P-G Products Mfg. Co. of New York to represent it for the 11 Western states. He will headquarter in Los Angeles. P-G Products makes fittings for washing machine connections. . Robert Lange, Eoff Electric Co., Salem, Ore., is one of the eight members of Motorola's distributor advisory panel meeting with company executives in Chicago this month to review marketing strategy for the next two months.

Change jobs

Mary Ann Gates, home service director for Montana Power Co., has resigned because she and her husband are moving to Arizona. A successor has not been named. . . Miss Betty Buettner, formerly home economist for Crescent Spices in Seattle, is General Electric home economist with the San Francisco regional headquarters, succeeding Marjorie Harper De Tillian, who resigned to be a full-time homemaker.

Standards

San Diego Bureau of Home Appliances reports that recommended Standards for Advertising and Selling of Appliances will be submitted soon. They were prepared by a committee of dealers and distributors, working with the Better Business Bureau.

Utility winners

Among prize winners in the 32nd annual Better Copy Contest sponsored by the Public Utilities Advertising Assn.: Washington Water Power Co., top award for dealer promotional literature; third prizes in interior display and two-color advertising series of 1954 freezer campaign. . . Hawaiian Electric Co., top place for two single ads, one promoting use of electricity, the other electrical merchandise. . . Arizona Public Service Co., third prize for its over-all program, Sell, Sell, Sell.

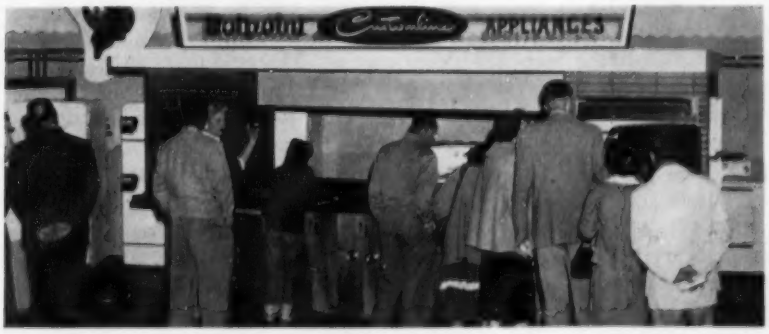
Women's Round Table

An Electrical Women's Round Table Chapter has been formed in Denver. Vergia M. Powell of Colorado Central Power Co., Englewood, is its president. Membership includes distributor, manufacturer, dealer, REA, utility, high school, bank and detergent company women.

San Diego Fair Nets Prospects

Crowds who jammed display booths were not just curious; they were prospective buyers

General Electric featured its corner kitchen display with wall refrigerator, built-ins, color



Hotpoint displayed its built-in range, dishwasher and separate cooking units and grill

Westinghouse showed 10 washers and dryers in color; built-in stainless-steel refrigerator

The trend to color and built-ins, observed at all recent appliance shows, was repeated in even greater measure at San Diego's Spring Fair, sponsored by the Bureau of Home Appliances at Balboa Park in late April. The collection, which was announced as the largest both for color and built-ins, drew crowds and brought forth prospects—not for just one or two appliances but for entire kitchens.

Hotpoint's special island display, including built-in range, dishwasher, separate cooking units and grill, refrigerator and other appliances, drew more than the attending dealer and the distributor's staff could handle.

Wall Refrigerator Featured

General Electric featured its corner kitchen display with wall refrigerator, built-in washer-dryer combination, built-in range and dishwasher, three colored refrigerators and two colored ranges. There was a separate display of a built-in range using wood cabinets.

Kelvinator showed 16 colored refrigerators and ranges.

Westinghouse had 10 colored automatic washers and dryers but its built-in stainless-steel refrigerator got most attention. This unit was arranged in a wall with the stainless-steel-front freezer.

Maytag was another manufacturer showing washers and dryers in color.

Outstanding and an attention getter was Pacific Tel & Tel's display, which showed all types of service.

Dealer Sales Up

One laundry equipment distributor reported that an average of two automatic washers or dryers each day were being sold at the display booth which, on the basis of previous records, would mean that 10 more units per day were being sold in dealer stores from leads developed at the show.

Television, a leader at San Diego's Fall Show, got less attention this time but sales were reported. It was too early in the season for air conditioning to draw many prospects. Freezers and food plans, however, were big drawing cards.

Among the new models being shown were two Easy washers. New Home's portable garbage disposer was getting a lot of attention. In the booth to demonstrate it was New Home's national sales manager.

ELECTRICAL WEST

Dedicated to the Sons of Martha

MAY and June are meeting months for the electrical industry in the Far West. From Colorado to the Coast, from the Straits of Juan de Fuca to San Diego, upward of 3,000 electrical people will have gathered in conventions, conclaves and conferences ranging in size from two score participants to more than 1,000. Contractors, distributors, utility people, dealers, manufacturers, inspectors, engineers, salesmen, operating folk, accountants, educators, executives and technicians will have met to exchange experiences, to note trends, to learn about new developments, ideas and equipment, to listen to challenges and to wrestle with mutual problems. All of this will have transpired for the advancement and progress of a dynamic industry and the people who staff it.

It is the lot of ELECTRICAL WEST's editors to attend these sessions and in the months mentioned they will have traveled thousands of miles so that they might listen, note and condense the pertinent and significant facts and opinions from addresses and discussions. This is done not primarily so that those who attended may have a memory-refreshing record, but so that those many thousands of folks not fortunate enough to attend may know about and profit from what transpired. This issue, then, is truly a Convention-in-Print for those who perforce had to stay at home to keep power on the lines, to see that new structures were wired on schedule and that customers were served without interruption or inconvenience. To them the editors dedicate these pages.

PG and E Waited 30 Years

IDAHO Power Company in its valiant campaign to secure FPC licenses for the Hells Canyon project on the Snake River should be heartened by the experience of Pacific Gas and Electric Company. The latter has just secured a license for developing additional power on the Kings River after 30 years of effort, negotiation and litigation. Of course in another 30 years the nation's major power source may be the atom or the sun but that is beside the point.

In many respects the Snake and the Kings River situations are parallel. PG and E had to contend with the interests and prior claims of more than thirty irrigation districts and associations. It also had to fight in the courts a power-hungry federal agency which claimed the Kings River site as part of a vast federal water and power bureaucracy. Lastly, it had to wait for the construction of a holding basin—Pine Flat reservoir—so that the many irrigation interests could be satisfied.

During all of this time, the site lay idle, its power potentials unused, although the financing and the initiative to develop them were available and the demand for the power existed.

So take heart Idaho Power; maybe you won't have to wait 30 years.

Salute to J. H. Polhemus

'TIS said that adversity builds character and leadership. James H. Polhemus, who last month retired as chief executive of Portland General Electric Company, typifies that maxim. He is one of a small group of Pacific Northwest utility executives, who in the last two decades have courageously and successfully faced up to a succession of problems unequaled in any other part of the nation. These difficulties began with emergence and recovery from a dark chapter in the financial history of the industry and include a life and death struggle with a government administration that was bound and determined to drive the private utilities of the region out of business. At the same time they included coping with a rising tide of inflation and a fabulous growth in demand for service brought on by the explosive upsurge of population and industry that has characterized the West. The stature and standing of Portland General Electric today is a fitting testimonial to Jim Polhemus' character and leadership in the face of such adversity.

However, it is the message of hope and encouragement that he gives to the young

EDITORIAL VIEWS

people in the industry that typifies him best. Here is what he said upon retirement:

"I joined this company at a time when it was still fashionable in intellectual circles to regard America as a country which had already ripened into economic maturity. Opportunity for young people theoretically was supposed to have diminished into mere replacement of tired oldsters as the latter thankfully died off and departed from the stultifying atmosphere of a static society. How wrong! In my humble opinion the last twenty years has seen more great changes in our nation and the world than any time in history. And in such a small part of it as our own company, changes have come so rapidly, one on top of another, that one needs look no further for ample evidence that there remains vast future opportunity for the ambitious and intelligent. I think it shall ever be so."

Time will prove Jim Polhemus right.

Watts and Water Heaters

PERHAPS it took the imminent invasion of the Northwest by natural gas to bring about something that the public wanted all along—quick recovery water heaters. If so the truth of "competition is the life of trade" again is proved. Utility companies are plunging into hot water with their rate and engineering departments perhaps but at least they may save this important balancing load against the "new" appeal of an old fuel that makes its first appearance with considerable blowing of horns.

Replacing of 1,500- and 2,000-w elements in water tanks in numbers may frighten the distribution men at first but like many other loads in the past that have seemed upsetting, this added wattage will probably be soaked up more easily than expected. There have been added so many other new appliance and lighting demands that the diversity and load leveling is surprising.

Chief consideration should be the customer satisfaction. For what else are utilities in business, anyway? With automatic washers and dishwashers and more baths the need for more hot water is here. Let's supply it.

You Can Say That Again

OF all the problems the utilities face, among the most important is recruiting graduate engineers of high caliber sufficient to provide the topnotch engineering leadership they must have in the future. This is important, for on it hangs the success or failure of both their growth and their technology. In recognition of this vital problem I submit ten questions for serious considerations. (1) Is your salary structure competitive? (2) Have you a good orientation and training program to integrate the young engineer into your business and whet his imagination to stay with you? (3) Have you combed your engineering jobs to be sure your engineers are offered challenging work? (4) Do you provide opportunities for continued education? (5) Do you have a planned management development program to insure that the man can develop at a rate commensurate with his potentials? (6) Are your recruiting and training people aware of your growth possibilities? (7) Are you close to the colleges and have you supported them in their financial difficulties? (8) Have you encouraged young men through scholarships and fellowships in the field of power? (9) Have you cultivated the professors and helped them keep up to date in power engineering? (10) Do you provide teaching aids to help sell your many challenges to young people? The degree to which you do these things will determine the quality and quantity of engineering talent you are able to attract. These incentives will boost your bargaining power by giving you a story that is full of both engineering challenge and opportunity as well as security. Sell it to the undergraduate. Only thus will you cease to be the poor relation in the lineage of electrical engineering.—A. C. Monteith, vice-president, Westinghouse Electric Corp., and president, AIEE.

A MESSAGE TO AMERICAN INDUSTRY • ONE OF A SERIES

TO AMERICAN BUSINESS...

Thanks for Taming a Wild Horse

This is a message of appreciation to American industry. The occasion for the message is the completion of our eighth annual McGraw-Hill Survey of Business' Plans for New Plants and Equipment.

To a considerable degree, our appreciation is personal. It goes to the companies whose cooperation made our survey possible. Twice as many companies as in any previous McGraw-Hill annual survey carefully answered our questions about their plans to invest in new producing facilities. They gave a great deal of expensive time to the job. The cooperation of these companies, which employ nearly eight million workers, put the results of our survey on the firmest footing, in terms of coverage, it has ever had. For this cooperation we are most grateful.

But our appreciation is much more than personal. It extends in even greater degree to the kind of planning of investment in new plants and equipment which our survey revealed. The nature of this planning holds out promise that American industry is on the way toward bringing under control what historically has been one of the most upsetting forces in the American economy—the violent fluctuations in business capital investment. Progress in ironing out these fluctuations gives occasion for public gratitude.

A full report of the results of the eighth annual McGraw-Hill Survey of Business' Plans for New Plants and Equipment will be sent to anyone requesting it from the Department of Economics, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York 36, N. Y.

Very Good Business News

The part of our surveys that attracts the widest interest is the news they give about immediate business prospects. And this year the news is very good. The survey results indicate that American business as a whole plans to invest $29.5 billion in new plants and equipment this year. That is 5% more than was invested last year, and a new high for any year.

Plans for the years 1956-1958 are also remarkably encouraging in terms of the amount of investment in prospect. American business reports that it is already planning to spend within 3% as much for new plants and equipment in 1956 as in 1955. In the past, the expenditures planned for future years have always been sharply lower than those planned for the current year. This is understandable enough. It is sometimes impossible to anticipate all the expenditures that will be necessary a year or more hence. Thus the fact that plans are already made

to spend almost as much in 1956 as this year is very good news about business prospects. The level of investment now planned for the years 1957 and 1958 is also remarkably high—far higher than ever reported for years that far ahead in previous McGraw-Hill surveys.

Taking the Long View

The fact that these plans exist is of immense constructive significance. It clearly indicates that more and more, and now in dramatic degree, American business is taking the long view in making its plans for capital investment. It is developing a program which, if successfully carried out, will go far toward eliminating the habitual, destructive surging and sagging of what is in effect the central power house of our economic system—capital investment by business. Upon the level of this investment depends not only the general state of our prosperity but our progress in raising the American standard of living with new products and new and better industrial processes.

Seven years ago, when we first asked industry to estimate its capital spending beyond the current year, only a small minority of companies could give us any estimates at all. This year, 87% of the cooperating companies—and it was a far larger number of companies—could comply with our request for estimates for the years 1956-1958.

It Pays to Bet on Growth

A number of developments help explain the increase in long-range planning of capital investment. One is the increasing technical complexity of American industry. It often takes longer, in this complicated age, to work out a successful installation of new plants and equipment. Another reason for long-range planning is American business management's increasing conviction that it pays to bet on the demonstrated capacity of the American economy to grow over the long pull. With this goes a corresponding determination not to let short-term business fluctuations upset individual company plans for growth through addition of new plants and equipment. An additional factor, and one of great and increasing importance, is the sense of public responsibility on the part of American business leaders who want to help prevent destructive swings in the levels of new investment.

It cannot be too strongly emphasized that there is still nothing automatic about the carrying out of these long-range plans for business spending. Actual expenditures are still governed in major degree by the general health of our economy. This is fully attested by the fact that the current business recovery has led to a substantial upward revision of the investment plans reported to us last fall when we made a preliminary check of plans for 1955. Either private economic excesses or a reversal of the recent improvements in federal tax policy could gravely upset realization of present plans. Fortunately, neither of these possibilities seems to be an immediate threat.

The very fact, however, that American business management has made these plans and will do its utmost to carry them out is a development of tremendous constructive importance for the American economy. It means that major efforts are being made to tame what historically has been an economic wild horse—the process of capital investment by business. Both for doing it, and for telling us about it in our annual surveys, we extend to American industry our sincere thanks.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

More than 1,100 members and guests were in San Francisco to take part in PCEA's 38th annual convention. Program theme was . . .

The Electrical Industry in Action

How the electrical industry must respond with positive action in effectively dealing with the rapidly changing problems of an electronic and atomic area dominated the program of the 38th annual convention of the Pacific Coast Electrical Assn. at the Sheraton-Palace Hotel in San Francisco, May 11-13. A total of 780 members of the electrical industry plus an additional 320 wives enjoyed and profited from a balanced fare of fine program and excellent entertainment.

Included among the challenges and opportunities for today and tomorrow that were presented by a talented group of speakers provided by Program Chairman I. W. Borda were the following: (1) Future growth potentials will tax both the faith and performance of the industry. (2) There is still a crying need for building public understanding on both the grass roots and the national levels. (3) Sales and promotional programs must be attuned to the industry's productive capacity. (4) Recruiting, training and utilizing manpower efficiently is still a major problem. (5) Operating and management techniques need overhauling to insure maximum efficiency. (6) New machines, materials and equipment are available to offset constantly increasing costs.

Those who worried lest holding the meeting at a metropolitan hotel would detract from interest and attendance had no cause for alarm. The facilities at the Sheraton-Palace were excellent and the entire tempo of the convention reflected great credit upon the general chairman, Hubbard & Co. Vice-President Marshall Lasher, and his capable group of committees. Attendance at the two luncheons was 766 and 685; the banquet attracted 822; at no session did attendance fall below 500.

Some of the most significant utterances of the many fine speakers are presented below. Detailed reports of their remarks will be found on other pages of this issue.

• **Harold Quinton,** president, Edison Electric Institute: "In the broad outlook for the peace and continuing prosperity of America one of the most hopeful factors is the dynamic power of its industrial progress coupled with our American ability to organize and harness this progress for the general good, when unencumbered by unwarranted restrictions. In the vanguard of this progress you will find the electrical industry."

• **Roy N. Dreiman,** president, Pacific Coast Electrical Assn.: "Teamwork is the guiding principle upon which our industry relies. Because of teamwork the electrical industry is sounder today than ever before. It is fast-growing, vigorous and strong in all of its segments, and it is making a great contri-

PCEA Program

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bution toward America's dynamic economy. Working together as an industry, thinking together as an industry, learning together as an industry and selling together as an industry, we can and must go forward."

• **Henry B. Sargent,** president, Arizona Public Service Co.; "If we so conduct our business that the citizens of these United States have a feeling of a liking of and understanding for us, our business and our utilities are going to put in this additional capacity that we're talking about, the increase from the 118,000,000 kw to the 310,000,000 kw in 1970. But if we fail to conduct ourselves properly, if we fail to have the imagination and the initiative to meet these problems, you can bet your bottom dollar that somebody else will be serving and putting in this additional capacity."

• **W. V. O'Brien,** vice-president and general manager, apparatus sales division, General Electric Co.: "Integrated selling is the carrying out of the ultimate physical sale only after the total considerations of selling have been noted, researched, analyzed, measured and managed. Integrated selling is a must if we are to be fully competitive. But there is a deeper and underlying need—the need for overcoming complacency, which is that very strange bedfellow of opportunity."

• **Dr. Robert D. Gray,** director, Industrial Relations Section, California Institute of Technology: "It is easy for many half-truths, partial truths and myths to develop among groups of people. Since a corporation consists of a group of people — employees and management—it is expected that certain fantasies will develop and become accepted. Opinion polls will tell to what extent these beliefs are true and to what extent conflicting evidence makes it necessary to modify these beliefs."

• **John K. Hodnette,** vice-president, Westinghouse Electric Corp.: "Growth of electrical manufacturers has paralleled the growth of the utilities since everything that we make is used, either to help you do your job, or to utilize your product. We particularly recognize our dependence on the utility industry because of one simple fact. The electrical manufacturing industry is not large because the utility industry is large. It is large because the use of electric energy continues to grow about 7% each year."

• **Dr. Frederick E. Terman,** dean of engineering, Stanford University: "We have an engineering and scientific manpower shortage. It's going to be with us in all probability for quite a long time. The jobs that we can see that need to be done, that we're working on now and that we see will be worked on in the future, put a new premium that never before existed on superior training of our technical manpower. This shows up in the extent to which people with this superior training are being appreciated . . . in the form of the dollars that are paid to them for their services."

• **R. C. Setterstrom,** president, Northwest Electric Light & Power Assn.: "The Eisenhower administration, through Secretary Douglas McKay, has proposed a sensible, workable partnership program for power development. I am firmly convinced that this partnership program is the only sensible solution for assuring adequate power in the Pacific Northwest. An orderly development of this sound partnership proposal is being hampered by those who attempt to make political 'hay' by labeling it a 'give-away' of natural resources."

• **Dr. Weldon B. Gibson,** director of economic research, Stanford Research Institute: "It is probable that new investments in the order of $60 billion will be needed in the West during the next 10 to 15 years or so for construction purposes alone. Another $40 billion or so may be needed for new plants and equipment. These investments are needed to provide jobs and to keep our economy on the rise in the population and economic explosion now leading us to a new business environment in the West."

• **J. K. Horton,** vice-president, Pacific Gas and Electric Co.: Electronic data processing machines "appear to hold great promise for revolutionizing the office. According to the recent Hoover Task Force Report on Paperwork Management, the comparative costs of data processing for a specific process were as follows: hand calculation, $25; tabulating equipment, $4; automatic machine, $1. When you add to that finding the fact that in our business $500 saving in costs equals $7,500 in sales—in its effect on earned surplus —it becomes readily apparent why we have such a serious interest in this development."

• **George Trexler,** manager, Utility Department, IBM, New York City: "There is no reason at this time to believe the savings anticipated by several utilities will not be realized and, in fact, it appears that they may even be greater. This should then give you sufficient assurance that electronic business machines will prove to be economically sound for your companies. It is my belief that in the area of forecasting, budgeting, engineering, power loads and power interchange, electronic data processing machines will play a very important part in the growth and improved operations of your industry."

• **Alexander R. Heron,** vice-president, Crown-Zellerbach Corp.: "If we are able to demand too much pay, if we withhold our effort, if we give less or poorer work than we are paid for, in each of these ways we are pushing the cost of the ultimate product closer to the mark at which the consumer will say, 'No thank you, not today.' Perhaps the biggest task we have in industrial relations is to help every worker, at every level, to see that his job is really a part of the process of making a sale to the ultimate consumer."

• **Joseph F. Leopold,** public relation counsel: "I told you that our government was in a tremendous variety of businesses. If by some magic wand we could wave over Congress so two laws would be passed overnight, one to tax on an equality with you and me all of these presently highly competitive but untaxed agencies, and another that would take the government out of business and—as we are rapidly doing at the moment—sell them to taxpayers, we would balance the budget overnight — and probably have a billion and a half to two billions to spare."

Our Challenge in the Years Ahead

Harold Quinton
President, Edison Electric Institute

Not only do our customers have faith in the electric industry and its inherent ability to serve their needs and wants, but they have faith in those who manage and operate our companies. I think I am justified in saying that never since the Menlo Park incandescent lamp and the Pearl Street Station of Thomas A. Edison has the genuine respect for and confidence in the electric industry been as high as it is today. It is a quiet respect, such sentiments always are, and though it is sometimes obscured by the blatancy of our critics, it is there nonetheless and it is a widespread, strong undercurrent of feeling.

Certainly we have our faults and we plainly see them. In fact we examine them closely with the very purpose of bringing about better performance, better organization and better equipment, and thus an even greater and increasing quality of public service. From such efforts and high purpose we also have the healthy fear of our informed opponents.

Respect and fear are each invariably accompanied by expectation. In the

Dreiman Scott

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Quinton Black

years that lie ahead our work is cut out for us to measure up to the standards and expectations which we ourselves have set and created in the minds of the American people. This for the years ahead is our challenge; and our record gives us hope and faith in further achievement.

But sound and full growth and development have never come about merely by standing by and waiting for them. That is not the way America became the industrial power it is today. Nor will standing by be fruitful in the years ahead. Growth and development will be achieved by risk taking, by intelligent industry and by real, not fancied, ability. The greater the effort, coupled with ability, the less will be the risk.

Let's not forget we have a big selling job upon us not only to maintain a good rate of business growth but, more specifically, to assure the fact that this growth shall be sound and healthy. Sound sales are dependent upon the creation of a wide diversity of demands from all classes of customers and, most importantly, they are dependent upon satisfied customers.

Many of you who read this have seen the day when you had tougher competition for business. But we always have stiff competition for the consumer's dollar. There are many things for which he can spend it other than electrical appliances, equipment and wiring. Also, we cannot afford to forget for one moment that there are many great technical advances taking place, and we can anticipate that some of them may very well make our competitive situation more difficult than it now is. The wheel can turn overnight. Unless we are adequately and capably manned in our sales departments, as well as in all other departments, we can find ourselves unprepared to meet this competition.

For many years, certain tightly knit groups in this nation have been advocating and lobbying for federal legislation to control and own natural resources, and to obtain appropriations for their development by the federal government. At the same time they have striven unrelentingly, and with remarkable success, for restrictive and discriminatory statutes against private capital. They have striven to place officials in the federal government who would translate their new statutes into even more restrictive and discriminatory regulations against free enterprise and in favor of governmental proprietary business. They have used tax exemptions to favor governmental proprietary businesses, free grants and loans at very low rates of interest, deferments of payments of principal and interest, harsh discrimination in the sale of power from government property paid for by the taxpayer, and other methods.

And while this has been going on, many of our taxpayers have not seemed to realize that free enterprise cannot be driven out or starved out of the power business without, sooner or later, profoundly and adversely affecting the future of other basic industries. The added weight of taxation alone on the remaining segments of free enterprise would go far to accomplish that result, even if there were no other adverse effects.

It now becomes increasingly apparent to thoughtful minds that the American government cannot go into business on a significant scale and remain a true republic. It is a well recognized principle that political freedom cannot exist without genuine economic freedom. If the citizens of the country receive their economic support from the government, they are powerfully moved to surrender their political independence. Of course we may retain the form of a republic. Even the Soviet Union holds "popular" elections. So did the Nazi government, but like those other nations we would have a republic only in name.

Recently the professional proponents of federal government power have resumed with new vigor their clever semantics, with quips and cliches and with half-truths, and with false and irresponsible charges against even the most honored citizens of our country, in their efforts to revolutionize our fundamental economic system.

I pointed out earlier in this year of my presidency of the Institute the clear objectives and policy of the Socialist Party in America as publicly stated by Socialist Party leaders. It is a policy of "encroaching control" and of "gradual socialization of industry." It was stated in this way:

"There is no driving power for Socialism like hunger . . . The old time carrying drive of Socialist doctrine was in poverty and prophetic promise. These no longer hold us" (in America)..."Between cataclysmic Socialism (revolution) and encroaching control (a little Socialism at a time), the latter will be the only one acceptable to this nation . . ."

"Our long time aim is the abolition of the profit system for private use . . . We must force our experts on agriculture, trusts, coal, power, subways, housing, milk, etc., to tell us correctly which the next steps are, and then take them and identify ourselves with their success."

This is the announced program of the Socialists in America.

The time has long since passed for the right-thinking people of America to take the offensive in challenging these alien and old-world concepts. And we proposed a program of amendments to the federal statutes affecting our industry as one such challenge. It is a positive program. It is a program of simple truths and of justice to all. Included in that program was a proposal to amend federal legislation to eliminate all duplicate regulation by the federal government.

"...As the power industry goes in the struggle for free enterprise, so goes the nation."

Terman Tenney

Maytham Sargent

O'Brien Sutherland

The full responsibility for electric utility regulation should be left with the states, and the federal government should withdraw from this field. The overlapping jurisdiction is costly, onerous and confusing. A significant characteristic of electric utility companies is that they are essentially local businesses with limited service areas. Regulation on the state and local levels has proved responsive to local needs and the result has been the rendering of a high quality of services priced most favorably low compared with all other costs of goods and services.

In the program which was proposed, and in many other ways, we must reverse the tide running against the free world and against freedom in the so-called free world. Individual liberty was attained by many struggles and can only be preserved by the same means. It is truly said that the price of freedom is eternal vigilance and that the way to preserve free enterprise is to be enterprising. If those in the vanguard of an advance would not be trampled upon they must keep moving. It takes effort and strength to keep up front. Young folks wishfully think that there must be an easier way than the blundering path the old folks have traveled, and some old folks hope that there will be peace in their time if we simply let things drift. But the evil forces of the world have no respect for idle thoughts. They yield only to the intelligence and power of forces greater than themselves. Freedom of enterprise demands at all times inspired and inspiring leadership—leadership that will serve—that will keep moving—that will keep up front.

I feel that as the power industry goes in the struggle for free enterprise, so goes the nation. In my opinion the power companies are in a position to continue to make a great contribution to the maintenance of genuine free enterprise in this country and thereby to help conserve genuine political freedom. I am confident that our examples of devotion to principle, of measuring up to our great tasks and great responsibilities, and examples of careful attention to all our many tasks that affect so much every person in this great republic are widely observed and noted. They are affecting and will continue profoundly to affect the course of action of other business enterprises, which in turn will affect the thinking and the course of action of the individuals who make up this nation. We do not labor for ourselves alone. Our contribution to the nation today gives hope and assurance to more people than we realize.

Public Relations—Key to the Future

Henry B. Sargent

President, Arizona Public Service Co., Phoenix

The electric industry is now facing the greatest challenge in its history, as the population of the U. S. grows toward a predicted total of 200,000,000 by 1970, according to Henry B. Sargent.

Projecting into the future, Sargent said that the industry will not only be called on to provide electricity for the tremendous growth, but also to supply four and one-half kilowatts of electricity per man-hour in 1970 as compared with 3.1 today.

The challenge recognized by Sargent, as he spoke to members of the Pacific Coast Electric Assn., is to maintain such good public relations that the people of the nation will allow the business-managed utility industry to provide for the growth. He said "a (public relations) program that holds water" will be the factor that determines whether the nation will be served primarily by private utilities instead of socialized industry.

As a key to good public relations, Sargent emphasized that the private utility industry must: (1) operate on a sound philosophy that lets the customer know the industry exists for the good of the customer; (2) operate efficiently, so that a better product will be carried to the customer for less money; (3) inform the public so that understanding can lead to public support of the industry; (4) have faith in the nation, in the electric industry and in the individuals who are part of both; (5) be willing to work, not just enough, but more than enough. To have "a recognition of our responsibility to further the interests of our company and our industry."

One method offered by Sargent that would tend to gain public support of the industry is a willingness to spend money, as for atomic energy research and partnership development of resources, for the good of the entire nation. Another is to take a firm stand in favor of good regulation, in a way that the customer knows it is being done in his interest.

Another contributor to good public relations is continuing research to improve service, lower costs and generally lead to "a better product for less money." Consistent improvements in generation and transmission facilities are two parts of this approach.

The industry must also have the right kind of people in it. People with "know-how" who will (1) plan objectives; (2) organize activities; (3) select other capable people and delegate authority; (4) coordinate the performance of all the people and facil-

"A public relations program that holds water will be the determining factor."

Hodnette Gray

Setterstrom Wilke

Leopold Gibson

ities; and (5) have good control of the whole operation so orderliness and efficiency are seen by the public.

Benefits from good public information programs were graphically pointed out by citing a 30-year growth period in the electric industry ending in 1932. At that time, despite tremendous growth and increasing popularity of the service, a poll revealed that 70% of the nation favored municipal ownership. The industry then went to work on a local basis to improve that attitude and achieved a standing that cut municipal favoritism to two per cent.

In the meantime, however, governmental ownership was growing by leaps and bounds and the industry had a new and bigger problem to face. It is meeting it with national public relations programs, such as Edison Electric Institute, Electric Companies Advertising Program, National Association of Electric Companies and the Public Information Program. However, Sargent said participation is still short of what it should be in these national programs.

Concluding, Sargent said that, when the industry can say it is doing all the things he mentioned for improved public relations, the people will mark their ballots in favor of the industry because they will know the industry acts in their interests.

The Integrity of a Sale

W. V. O'Brien

Vice-President and General Manager, Apparatus Sales Division
General Electric Co., New York City

The vital role of selling is clearly established in the electrical industry. The actual techniques of selling, of course, have been explored time and again, and they deserve the full textbook attention they have received. The specific methods of selling techniques differ with those of us in the contracting, distributing, electrical equipment manufacturing, and the utility areas of the whole electrical industry, not to mention differences within other industries.

But in one important respect we can and must find common ground. This is in our approach to selling. It is what I like to call integrated selling. But—so that this does not seem to be just one more catch-phrase—let me define integrated selling in terms of its eight essential ingredients.

In the first place, integrated selling calls for recognizing and planning in every area that affects the total distribution cost; in other words, we must achieve integrated distribution. Today's sales management has a responsibility to the individual salesman and to the customer, to plan for unrelenting improvements in market research, in accounting, in financing, in advertising, in application engineering, in warehousing, in transportation — in other words, in the total areas involved in the distribution and marketing of goods.

In the second place, integrated selling calls for adjusting our sales efforts to changing conditions. It is modernized sales effort. The simple bartering days of the old horse trader have long since left us. The marketing and distribution functions have embraced and guided the direct sales function. The individual creative sales effort remains; only the conditions have been changed.

Let me give you an example of what I mean. If in 1944 you were a salesman of a company having products in wide use throughout General Electric. you would have had to contact about 15 purchasing men—the general purchasing agent, his two assistants, a couple of purchasing men in the Schenectady plant, plus plant men in ten other cities.

Today, if you had the same assignment, with our growth and decentralized operations, you would have to see, in addition to the general purchasing group, some 80 departmental purchasing agents in some 40 different cities.

Of course, this example is not peculiar to General Electric—the acceptance of decentralization throughout industry has created similar situations over a broad area.

While the individual salesmen must be aware of the changing conditions, the basic responsibility for integration of the sales effort falls upon sales management, with management supplying thorough guidance for the sales force.

This is especially pertinent to the third ingredient of integrated selling—consistent sales efforts that are not affected by short-range economic adjustments or short-sighted sales management. It is encouraging to note that for the first time in our nation's history, sales expenditures went up while sales were temporarily down in 1954. I earnestly hope we have seen the last of the two-type sales approaches oriented to meet either the buyers' market or the sellers' market. It is axiomatic that sales successes are hard won, but easily lost.

In the fourth place, integrated selling calls for a thorough program of manpower development. This is no more than recognizing the fact that if we are to be competitive, and if we are to capitalize our capabilities, we must be prepared to develop our most priceless asset.

Closely associated with manpower development is the fifth ingredient for integrated selling: increased prestige for salesmen. By this I mean raising the level of the whole selling profession to the same status as the doctor, lawyer, and teacher. Why is it that we sometimes avoid this word salesman? We

"Fortunately the egocentric approach is now on its way out."

Heron Metz

Horton Trexler

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have field representatives, sales representatives, sales agents, and a dozen other words that seem to suggest that there is some lack of confidence implied in the word. Is it because we are still trying to live down the old concept of the old-time foot-in-the-door peddler? Or is it that the impression is still being created in some areas even today? I submit that you and I cannot afford to hire the man on the street, call him a salesman, and somehow expect everything will work out all right. The need is to select high level men and train them to do the invaluable job of which they are capable. Investing more in each individual salesman will indeed save money in the long run; and in the area of compensation, I would take one top-notch salesman at $12,000 a year before I'd hire several run-of-the-mill men at $5,000 a year. A survey by the American Management Assn. recently found that a mistake in the hiring of a salesman cost an average of $6,684.

The sixth requirement for integrating selling is customer-oriented planning. You all recall the old story about the dog food manufacturer whose sales were slipping, and the expert concocted the wonderful new dog food formula that would solve the whole problem. Of course—there was just one thing wrong—the dogs didn't like the stuff.

Fortunately, the egocentric approach is now on its way out. At one time it was said that the men who designed ash trays for automobiles must have been nonsmokers. But today industry is wisely investing in surveys that show customer preferences, and we are guided accordingly.

This type of customer-oriented approach is a proven necessity in every phase of our integrated selling job.

The seventh requirement for integrated selling is the development and use of creative selling. Essentially, this means creating a favorable climate for a sale where none existed before. The creative salesman of today is a scientist who knows his product and its market, but he should also know something about long-range economic trends, advanced manufacturing concepts — all the factors that enable him to tell his customers what they will require for the future.

The eighth basic requirement for integrated selling is industry cooperation. This begins with recognizing the interdependence of all segments of the electrical industry, and then proceeding to do something about it. The very existence of organizations like the Pacific Coast Electrical Assn. is evidence of progress in this direction.

And so, we can add up the eight essential ingredients of integrated selling: Integration of the total distribution function; modern sales efforts which meet the times; consistent, long-range sales efforts; adequate manpower development; increased prestige for salesmen; customer-oriented planning; creative selling; and eighth, industry cooperation.

If we recognize the need for integrated selling, and if we employ the approach of integrated selling, we will have gone two-thirds of the way in overcoming the dangers of complacency.

Before concluding, let me restate the fact that integrity in its ethical concept must pervade every area of the integrated selling job. This is not a postscript to the sales effort, but the foundation of all sales success.

It depends upon the mutual respect, belief, and understanding of both buyer and seller. It calls for replacing the "caveat emptor" (let the buyer beware) approach with a sense of trust and responsibility that does justice to buyer and seller alike.

To the seller, it means giving full attention to such obvious but all-important factors as product quality, price and service. To the buyer, it means weighing not only these factors, but also the contributions of the seller in terms of advanced and applied research, product development, and loadbuilding and institutional programs that serve the interests of the whole electrical industry.

The absence of such an understanding of basic responsibilities means taking advantage of each other. The acceptance of such an understanding means taking advantage of our common opportunities, and in so doing, giving real meaning to the integrity of a sale.

Pioneering for Economies

John K. Hodnette
Vice-President and General Manager, Industrial Products
Westinghouse Electric Corp., Pittsburgh

It seems to me that there are six major ways in which electric manufacturers can give power companies more value. These are higher efficiency, increased reliability, less expensive installation, ease of maintenance, lower first cost and, finally, by bringing forth a product that will enable you to do something that you have not been able to do before.

These various elements of increased value seldom stand absolutely alone. For example, the trend to larger ratings of generators and transformers in smaller physical sizes offers higher efficiencies, less expensive installation, lower first cost per unit of capacity and the ability to handle greater concentrations of power.

I ask that you keep in mind that this progress has not been accidental or haphazard. These developments have come about because the electrical manufacturing industry and the utility industry have been "pioneering for economies." And just as in any pioneering, the two basic requirements have been dissatisfaction with what we have now, and a willingness to break with the old and take a chance on the new.

"One reality must be faced: someone must be willing to pioneer."

One reality that must be faced by all of us who demand progress is that "someone must be willing to pioneer." Even though the potential rewards may be great, it is not always easy to give that "go ahead" decision. What if no manufacturer had been willing to try to build and no utility had been willing to try alternating current, a 3,600-rpm turbine, a hydrogen-cooled generator, or the high voltages so common today? The pioneers of each such advancement—always joint ventures of progressive utilities and imaginative manufacturers — deserve much credit for the savings available to us all.

An example of pioneering for increased value through increased reliability is the new Thermalastic insulation for rotating machines which has been replacing asphalt-base materials in the last few years. A new type of insulation might seem drab to an energetic operating man. But the molecule juggling opened up a whole new world of insulation where temperature changes—with its expansion and contraction—need no longer be dreaded in machine design.

Pioneering to increase value through lower installation costs has resulted in a whole family of unitized, or more completely factory assembled equipment. Metalclad switchgear, unit substations and power centers have been specifically developed to realize this advantage. But the same principle is used with apparatus that may otherwise be unchanged. The steel skid mounting of high voltage circuit breakers permits the shipment of three-pole units or a steel channel or H-beam mounting. As a result, installation costs are cut in half. In addition, the volume of oil in the higher rating breakers has been reduced approximately 50%.

Goodwin Hynes

Christensen Tuttle

Pioneering to increase value through ease of maintenance has taken many forms. The introduction of new finishes, new materials, or new components has resulted in decreasing or eliminating certain maintenance operations. Where maintenance cannot be eliminated, the approach has been to make it easier. An example is the replacement of carbon brushes in the exciters of large hydrogen-cooled turbine-generators. Four years of detailed study of brush holders and enclosure design resulted in a construction which allows replacement of brushes without tools—while the machine is running. This development has eliminated costly shutdowns to replace brushes and has also increased safety.

Pioneering for increased value through lower first cost is more frequently thought of in connection with the manufacturer's own internal cost reduction programs. And it is true that it is the manufacturer's problem to find and apply new materials, new tools and new techniques to enable him to lower his costs. But here again, the user can help through his acceptance of new materials and the modified designs and especially through industry-wide standardization.

The final method of increasing value is through pioneering in entirely new products which will enable you to do something that you have not been able to do before.

Here I want to give only two examples. One is a relatively small device — the inexpensive, outdoor pole mounting secondary feeder capacitor which permits correcting low power factor near the load and which relieves the transformer of this extra burden. The other example is very large—the 330-kv, 25,000,000-kva interrupting capacity circuit breaker, which makes feasible longer distance transmission of larger blocks of power.

To summarize, the ideas and the knowledge that led to the economies of the past have come from field experience and the equipment user, from the research and development laboratories and from the manufacturer's engineering and cost reduction programs.

There are still many opportunities for increased value through industry-wide product standardization. This activity needs your continuing support.

Changing Environment Of Business

Weldon B. Gibson
Director of Economic and International Research
Stanford Research Institute

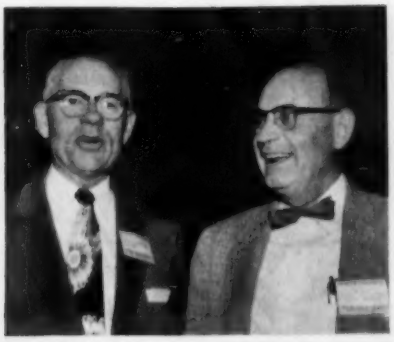
This talk on the far-reaching changes taking place in the Western business and industrial scene will be published next month.

Waggoner Bodine

Pape Schaefer

Keen McCarthy

Adams Corlett



Johnson McNab

No Sale—No Job

Col. Alexander R. Heron

Vice-President, Crown Zellerbach Corp.

"One of the biggest changes in the American economy since the nation was established has made almost every worker dependent on sales," was the opening statement of Col. Alexander R. Heron, in his luncheon address.

When Washington was president, almost 90% of the free adult males of the country were self-employed. In contrast, 85% of the gainfully employed in the United States today are on some pay roll. This means that 55,000,000 people are not selling their services or products directly to the final consumer.

The man today who has skill, strength, time, energy, and who needs an income for his work, must align himself with a business enterprise of some kind, Heron said. He must depend on that enterprise to sell his services for him. Business enterprise, therefore, has the responsibility for providing enough jobs by selling enough of the products of those jobs.

The American economy belongs to the people of the United States, and the people who constitute management in the U. S. hold their jobs because the people of America still trust private management to operate the American economy. There is no other place in the world where that condition exists today.

If private management does not meet the essential demands which our nation places on its economy, private management will lose the job of managing the economy.

"What are these demands?" asked Heron.

"The people of our nation expect a distribution of the ability to acquire goods and services sufficient that each person, in increasing measure, can reach toward the upper level of a standard of living considered nationally acceptable. In order to accomplish these things, the people expect jobs.

"It is not stretching the point to say that the basic right, the right to life, can be interpreted to mean the right to a job."

In those areas where private management has not been adequate to meet the demands of society upon the economy, he pointed out, it has been shouldered to one side and government management has stepped into the breach. But government cannot forever create jobs by issuing fictitious money and distributing it to people for doing fictitious tasks. There is only one way in the world by which any job has ever been created, and that is by selling the product of that job to a willing customer.

"Every act of management that has an effect upon the sales of an enterprise has a direct effect upon the volume of employment. This is so fundamental that we must look upon this function of management as being the function of selling work . . . the time, the skill, the strength, the service of 55,000,000 workers in the United States who are on pay rolls," Heron said.

The combination of technology, capital, management, trained workers and highly organized distribution has made possible an abundant supply of all the goods and services needed. But unless the people buy those goods and services, production will stop, and they must not cost more than the customer is willing to pay.

If the nation's working force demands too much pay, withhold effort, give less or poorer work . . . it is pushing the cost of the ultimate product closer to the mark at which the consumer will say, "No thank you, not today."

"Perhaps the biggest task industry faces is to help every worker, at every level, to see that his job is really a part of the process of making a sale to the ultimate consumer," Heron concluded.

"The basic right, the right to life, can be interpreted to mean the right to a job."

Big Business Without Income Taxes

Joseph F. Leopold

Public Relations Counsel, Dallas

"This is not the government under which I was born. Somebody's been tinkering with the machinery. And further, if my analysis is correct, we've been in the hands of a lot of rim-fire 22-caliber short intellects for a period of years, and I think I know the reason. The reason is that you and I have accepted all the privileges of American citizenship, and entirely too little of the responsibility that goes with it."

With this remark, Joseph F. Leopold placed the responsibility for too many tax-free businesses in the nation into the hands of every citizen of the United States.

Government in business also drew fire from Leopold as he enumerated many of the items Uncle Sam manufactures and the competitive services, such as warehousing, tugboat service, electricity and others.

Leopold preferred to call "creeping Socialism" "galloping Socialism," and pointed out the dangerous ground with government competing with private enterprise. He offered as a formula to determine quickly the extent of "Socialism" in the U.S.:

". . . so far as excess profits are concerned, today your level is 52%. So if you want to get a really quick formula, you can figure that we are 48% free enterpriser and 52% Socialistic."

He said the U.S. owns greater inventories today than all the private enterprise together in this country. He also stated that the government's practice of running factories and other businesses in other countries, "wherever we have loaned a dollar or extended our influence," has been injurious to international relationships.

"The galloping Socialism in government is there because careless citizens voted it in."

Mutual companies and cooperatives also received Leopold's attention, particularly the tax-free, yet competitive position that they enjoy.

He said cooperatives in the nation did a business in excess of $20 billion in 1954, and the figure did not include mutual companies.

In regard to REA cooperatives, he said, " . . . remember that 92 plus per cent of all the farms in the United States now have access to electric service, and yet our government continues to loan your dollars and mine for a long period at two per cent interest; borrowed from you and me in the form of bonds at about three per cent interest, average."

In order not only to stop, but also to reclaim business from, government ownership and tax-free organizations, Leopold strongly urged more individual contact with congressmen who are in position for direct action.

It is Leopold's belief that this is the power the American citizen has that he doesn't use, or uses too little and too late; that the "galloping Socialism" in government today is there because careless citizens "voted it in."

He called for direct action to (1) eliminate government-in-business, and (2) revise tax laws so mutual companies and cooperatives are included on an equitable basis with free enterprise.

To emphasize the importance of the situation, Leopold pointed out that history shows that ". . . no form of republic or government known as a democracy has lived, in all of recorded time, longer than 200 years. In 1976 our government will be 200 years old."

He stated that he did not personally believe that the U. S. democracy would cease in the historical time, but that fast and thorough action now is required to assure that it continues.

Section Reports and Annual Meeting

In opening the annual meeting, President Dreiman set an example of brevity that was continued in the reports that followed. Although all were condensed to save time on the busy Friday afternoon of the conference, it was evident that PCEA had had a good year.

K. C. Christensen who succeeded Jim Pollard as treasurer on his retirement last year, reported that financial affairs were in good shape.

Commenting on the fluid condition of the association, Victor W. Hartley, managing director, commended the board of directors for adapting its thinking to changing conditions. Basic programs had been carried on but, under flexible planning, others were modified to suit changing conditions, he said. An innovation, he reported, is an advisory committee for each section to assist the chairman and give continuity of effort.

Reporting some of the outstanding committee work, he said that the home economics committee's booklet, *Food Freezer Facts*, given to Edison Electric Institute, for publication, had been awarded a certificate of merit.

Another noteworthy project, he said, was the illuminating design for intersections prepared by the highway lighting technical committee. Small wire models pinned to a large drawing can be adjusted as traffic increases. He also commended the work of the school lighting committee, the accident prevention committee, the 4-H club project (which had enrolled 3,925 for a 17% increase), the code and ordinance committee, the Hawaiian Electric Living committee.

The Hawaiian conference would be held Nov. 10 and 11, he announced.

Membership was up, Hartley reported, with a total of more than 4,500.

J. T. McNab, Arizona Public Service, reported for the Administrative Services Section. He told of the three joint meetings with the Pacific Coast Gas Assn. Accounting Section—one at San Francisco, one at Phoenix and a special meeting on electronic data processing at Los Angeles. He recommended earlier program planning to give management a bigger hand in selecting topics and leaders; suggested that papers be prepared in advance and be bound for future reference.

Reporting for the Business Development Section, J. A. Corlett, G-E, said the section's principal objective during the year had been to reactivate the committee system. A conference was held in Fresno in January with more than 300 attending. He recommended a higher degree of continuity in committee work and that in addition to "talking to ourselves" the committee do more "talking to others." Examples of the latter, he said, were appliance workshops for teachers put on by the home economics committee and industrial heating clinics held by the commercial-industrial power utilization committee.

W. T. Johnson, California Electric Power, chairman of the Engineering and Operating Section, said that the annual conference at Pasadena, attended by 550, was the second largest on record. He encouraged more written papers and recommended appointment of a committee to study inspection and maintenance cycles of major equipment and make recommendations. He also suggested an assistant sponsor for each subject and appointment of department heads in the larger companies to act as contacts for sponsors. Appointment of student aids was another of his recommendations.

Recommendations of the nominating committee, headed by Ray Turnbull, G-E, were unanimously accepted. S. W. Scott, Graybar, Los Angeles, becomes president. H. C. Gerster, G-E Supply, Los Angeles, L. G. Maechtlen, Square D, Los Angeles, and Reid Gardner, Southern Nevada Power, who succeeds Scott, are new members of the board of directors. Directors re-elected for two-year terms: W. E. Cranston, Thermador, Los Angeles; C. C. Ernst, California Electric Power, Riverside; L. M. Guibara, U. S. Rubber, Los Angeles; G. N. Hawley, Southern California Edison, Los Angeles; R. G. Holabird, National Electric Products, Los Angeles; A. J. Schmitz, Allis-Chalmers, San Francisco; E. D. Sherwin, San Diego Gas & Electric; N. R. Sutherland, PG and E, San Francisco; George C. Tenney, McGraw-Hill Publishing Co., San Francisco; C. A. Wikle, A. S. Schulman Electric, Los Angeles.

At the directors' meeting following the general session, regional vice-presidents were appointed. They are Henry B. Sargent, Arizona Public Service, Arizona; L. A. Hicks, Hawaiian Electric, Hawaii; F. A. Tracy, Sierra Pacific Power, Nevada; J. M. Tuttle, Motorola, northern California; G. N. Hawley, Edison, southern California.

Registration of 770 was reported by Dexter Stoner, PG and E, registration chairman.

Golf prizes were awarded at the banquet Friday night by Roy W. Kimberlin, Graybar, chairman of the event. The Addison B. Day cup went to L. K. Horn, PG and E; the Pelton cup to A. W. Tracy, Anaconda; the H. M. Byllesby cup to R. Riley, Anaconda.

Other entertainment included a tour of the Pittsburg steam plant, headed by W. Frank Pape, PG and E, and the cocktail party given by manufacturers, manufacturers' agents and distributors, for which R. M. Waggoner, Hubbard & Co., was chairman. Charles W. Goodwin Jr., G-E Supply, was chairman of the Friday night banquet. James M. Tuttle, Motorola, arranged entertainment for the ladies.

Other chairmen who worked long hours with Convention Chairman Lasher to make the event the success it was: James Davenport, Southern California Edison, attendance; J. P. Schaefer, PG and E, housing; I. W. Borda, Okonite, program; Carl Albracht, Westinghouse, publicity; K. C. Christensen, PG and E, reception; Carl P. McCarthy, stage manager; W. A. Hynes, PG and E, transportation and information; R. W. Keen, G-E, ushers.

Bill Duncan, standing, and David Millar, seated center, discuss farm load-building ideas

Record Attendance at RMEL

System engineering discussions drew the attention of the majority of 412 delegates to a recent conference of the Rocky Mountain Electrical League in Denver.

With a big build-up of generating capacities getting priority in the Rocky Mountain region since the end of World War II, transmission and distribution engineers have been faced with expanding and maintaining existing systems. Now more attention and budget allowances are directed to new facilities.

Notable was the interest in interconnection information presented by Fred Wiley, City of Colorado Springs, and Vincent J. Isele Jr., Southern Colorado Power Co., Pueblo, whose respective systems have been interconnected for the past two years.

With the Frying Pan-Arkansas and Upper Colorado River projects in view as possible future sources of energy, utility companies of the area are making tentative plans for interconnection to wheel power. However, some talk at the meeting indicated that interconnection plans are not wholly dependent on the outcome of the river projects but will stand on their own merits.

Benefits from interconnection reported by Wiley and Isele are: (1) alternate power for emergencies; (2) cuts in generating reserve capacity; (3) allows use of most efficient equipment of both systems; (4) interconnection between Pueblo and Colorado Springs fits in with possible future tie-in with Public Service Co. of Colorado and the Bureau of Reclamation.

Human Relations Discussed—Dean Clifford G. Houston of the University of Colorado spoke out against what he termed "tough" bosses as he presented his "discovery and development" approach to employee relationships and supervision.

He said the "tough" approach to supervision arouses a defensive attitude in the employee and the definitely known results are a loss of perception and production. He said the tough leader lacks confidence in other people because he lacks confidence in himself. He is often a person who finds it difficult to delegate responsibility.

Dean Houston's approach to good supervision includes a "permissive approach," where the employee is at all times regarded as an individual with ideas of his own on production or work problems. Permitted to voice these ideas, and perhaps see them in concrete form, the employee not only makes a valuable contribution to the company, he also strengthens his own security and confidence and becomes a more valuable employee.

Office of the Future—"There will be no meter reader in the utility company of the future," was a statement by John N. Raines, Denver branch manager for IBM. He forecasts the day when an automatic signal reads any individual meter from a central office; records the reading; automatically finds the account; then produces a bill—in about three seconds.

Explaining current trends in machine accounting, Raines said there is equipment for the small office too. His personal opinion, however, is that the machines will become bigger, and small offices will have work done on them on a kind of "custom order" basis.

Tells How to Get Sales—Emerson Dole, NARDA vice-president and Wichita, Kan., appliance dealer, told those attending a sales session that follow-up calls on appliance purchasers prove to be an excellent source of new leads and sales. The practice is effective because "we never knock on the right door," Dole said.

The idea is to "accidentally" go to the house of a neighbor instead of the house of the customer who has already purchased an appliance. Before the mistake is "discovered," the impression that the firm backs up its appliances with service calls is established. The audience, of course, is nearly always a person who has been softened up because she knows about, and probably has seen, the appliance already. In Dole's organization 60% of the home demonstration appointments are made on the sales floor, the rest by wrong door-to-wrong door prospecting.

Dole's own well-trained sales force is built up on a formula he said could be applied to other retail outlets. The formula: (1) Set a reasonable and adequate sales quota; (2) divide it by $6,000; (3) the answer is the number of salesmen needed to achieve the quota and still allow each enough of a market to make a good salary.

Commenting on competition from discounters, Dole said:

"If a discount house has the same appliance and buys it from the same distributor—you have the wrong appliance and the wrong distributor."

Atom Power for Peace—George M. Gadsby, Utah Power & Light Co., and chairman of the Rocky Mountain Nuclear Power Study Group, said electric utilities in the Rocky Mountain area would be among "early arrivals" in the actual use of atomic power for peacetime purposes.

"The world's reserve of uranium ores and thorium sands for nuclear fission and the unlimited supply of materials for thermal reaction of atomic fusion will insure heat from which energy can be converted into productive work during the centuries of the future.

"But there is one important proviso. If in the folly of the peoples of the world, and the tragic ambitions of their leaders, this new force is used to destroy our civilization, there will be no need for an augmented energy supply until, in God's own time, He brings

Yetter Breslin

Loiseau Gadsby

Hubbard Haines

Dole

Spencer Stauffer Berri

forth from new origins another civilization to occupy this earth."

Good Bosses and Employee Relations—"Employee relations are a basic component of public relations," said J. A. Spencer, manager of employee relations of General Electric Co.'s apparatus division, New York.

He said that top executives, generally speaking, are responsible for satisfying employees' needs for good pay, good working conditions and job security. More specific and equally important employee influence takes place at the supervisory level.

Spencer recommends teamwork supervision, where the supervisor is the "quarterback" calling the plays after advice from the "coach" (management).

The supervisor should be a responsible and loyal leader, not a driver, and be able to inspire by understanding the personal needs of individual employees so far as praise, assistance and advice are concerned.

The importance of two-way communications all up and down the line were emphasized by Spencer. He said he conducts round-table discussions with 10 or 12 of his own supervisors at a time. The practice provides an opportunity for management to state needs and report on business activities, and for employees to get answers to their problems. From the round-table the information is passed along to other employees by the supervisors attending.

L. M. Stauffer, RMEL vice-president and Denver employee of General Electric Co., presided at the luncheon.

Load Building on Farms — David Millar, operations field representative, U. S. Department of Agriculture, REA, reported on progress being made in the organization and early promotion activities of the Colorado Farm Power Council, a joint effort of REA and Colorado utility companies to encourage a wider use of electricity on farms.

Colorado Farm Power Council with W. L. Duncan, G-E Supply, as head, was formed Sept. 12, 1954, as a statewide unit of the Department of Agriculture's National Inter-industry Farm Electrical Utilization Council. The Colorado organization is made up of five private utility companies, 14 of the 22 REA organizations in the state, manufacturers and distributors of electrical products.

Millar said that the joint load building activity was started because REAs and private companies alike found that rural consumption of electricity was not increasing fast enough to support the facilities necessary to take the service to farms.

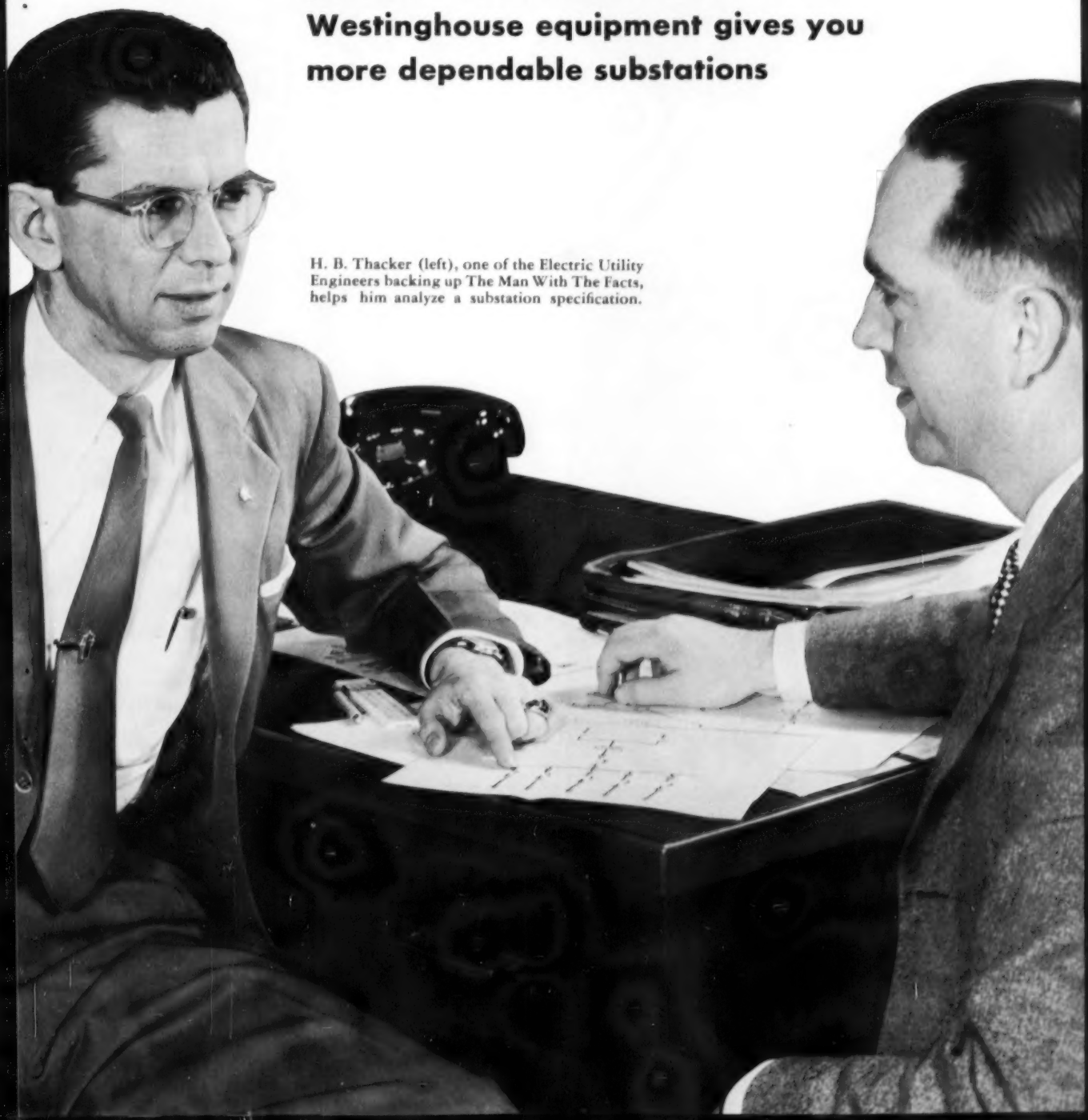
Current promotional activities are concentrated on adequate wiring and appliance sales, with an electrical appliance and equipment show tentatively planned for the near future.

Conference Committee—The RMEL Spring Conference activities were arranged by Ralph Hubbard, RMEL executive secretary, who was assisted by Merle Mensor, Lillian Wolfe, and conference committee members K. J. Haines, David H. Griffin, A. A. Roebke, H. S. Shott, J. N. Kerr, W. L. Duncan and Ken Eaton.

Paul A. Yetter, Public Service Co. of Colorado manager of division operations, was general chairman, with RMEL President W. L. Breslin, president and general manager of Western Public Service Co., helping to guide activities.

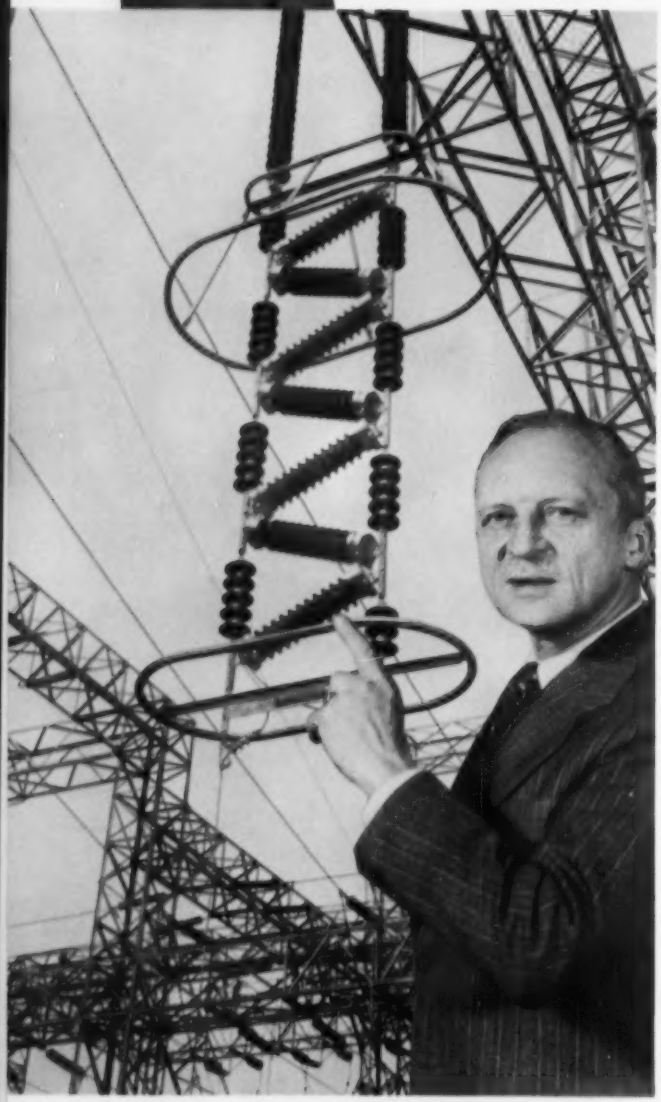
The Man With The Facts

. . . Your Westinghouse sales engineer . . . presents vital facts on how Westinghouse equipment gives you more dependable substations



H. B. Thacker (left), one of the Electric Utility Engineers backing up The Man With The Facts, helps him analyze a substation specification.

FACT:
Improved arrester performance gives more dependable and economical protection



Backing up The Man With The Facts is Ed Beck, Manager, Lightning Arrester Engineering. Lower discharge voltages of station arresters, he points out, mean expanded protection zones, therefore fewer arresters at many substations.

In both the Westinghouse station "SV" and line-type "LVS" arresters, maximum discharge voltages have been lowered to provide the greatest protective margins available in high-capacity arresters.

These lower discharge characteristics give you:

- Expanded zones of protection at arrester installations . . . this may result in fewer arresters at large stations.
- Economies in selection of arresters because new LVS characteristics are below those of previous station-type arresters.
- The possibility of using 100% arresters to protect reduced insulation.
- Reliable protection against direct strokes at unshielded substations because the maximum discharge voltages at 100,000 amperes of lightning are below the BIL of the protected equipment.
- Simpler surge protection on the unit-type generation system.

Westinghouse SV and LVS arresters have 60-cycle spark-overs not less than 1.8 times the arrester rating. This relatively high 60-cycle spark-over increases the margin of safety against damage to the arrester from abnormal voltage conditions such as switching large capacitor banks.

These are the facts . . . facts that make Westinghouse lightning arresters today's greatest protection value.

ARRESTER PERFORMANCE CHARACTERISTICS

Rating KV RMS	Min 60 ~ Spark-over RMS	Maximum Discharge Voltages, KV Crest				
		1500	5000	10,000	20,000	100,000
SV Arrester						
30	60	73	85	93	100	125
73	140	178	206	225	245	305
195	350	475	550	595	645	810
LVS Arrester						
30	60	86	101	112	124	
73	130	220	262	290	320	

FACT:

Sealed deep-drawn steel case with internally mounted bushings is shown here by R. R. Kelley, Instrument Transformer Engineering.

New potential transformers are hermetically sealed for top performance and long life

Furnishing current for metering and relaying control circuits is a function vital to your over-all substation performance.

That's why Westinghouse hermetically seals the new, 2400-volt PT and PTO transformers—to assure you an absolutely reliable source of control current, regardless of length of service or weather.

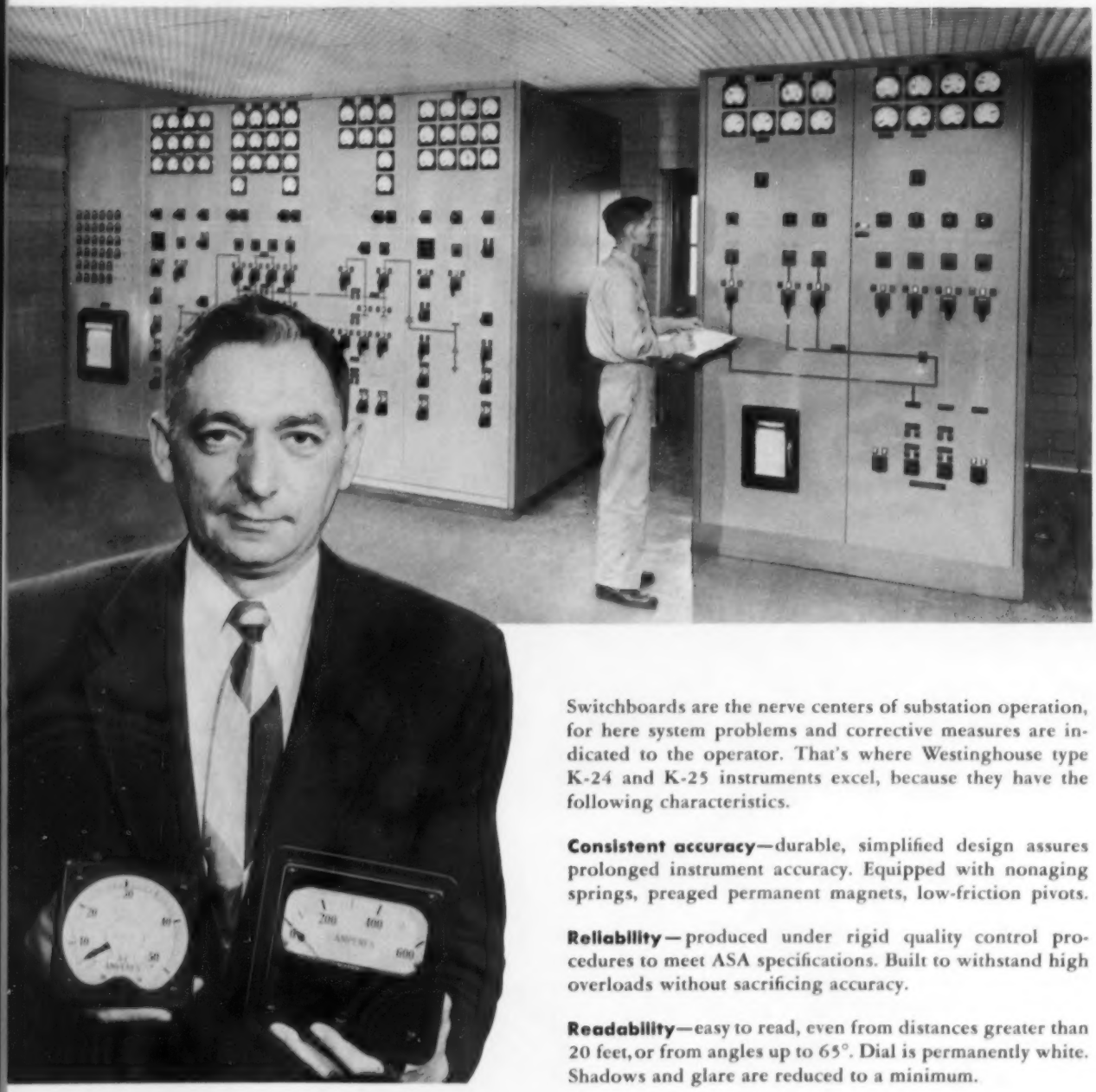
Here's how hermetic sealing is achieved: First, the PT-PTO designs use deep-drawn steel cases with internally mounted bushings and welded bases. Second, the core-coil assembly is vacuum-impregnated and filled with plastic, a process pioneered by Westinghouse.

The results are what you'd expect: Moisture and air completely excluded—no possibility of internal corona—uniform characteristics for the life of the units. A truly reliable, trouble-free control source under any weather or temperature extreme.

For dependability that includes long life and practically no maintenance, specify Westinghouse PT and PTO potential transformers for your substations.

YOU CAN BE **SURE**...IF IT'S Westinghouse

FACT:
Consistently accurate instruments guard switchboard dependability



Dependable type K-24 and K-25 instruments are displayed by A. J. Petzinger, Manager, Instrument Engineering, another of the product experts who back up The Man With The Facts.

Switchboards are the nerve centers of substation operation, for here system problems and corrective measures are indicated to the operator. That's where Westinghouse type K-24 and K-25 instruments excel, because they have the following characteristics.

Consistent accuracy—durable, simplified design assures prolonged instrument accuracy. Equipped with nonaging springs, preaged permanent magnets, low-friction pivots.

Reliability—produced under rigid quality control procedures to meet ASA specifications. Built to withstand high overloads without sacrificing accuracy.

Readability—easy to read, even from distances greater than 20 feet, or from angles up to 65°. Dial is permanently white. Shadows and glare are reduced to a minimum.

Be sure to specify Westinghouse switchboard instruments for your substations. Selection is complete . . . gives you coordinated styling or match-up for every condition.

J. W. Carr, Relay Specialist, shows the HZ-4 relay designed to help your system provide dependable, uninterrupted service.

FACT:

High-speed, precision relays safeguard your system

Westinghouse HZ-4 relays are fundamentally simple in operation and inherently fast. These single-phase, three-zone, distance-type relays clear faults in less than 0.05 second, give three advantages to a power system:

System can handle larger amounts of power because stability limits of system are raised.

Fault spreading is minimized so that possibility of damage to equipment is reduced.

Faster reclosing gives increased continuity of service.

HZ-4 relays protect the line from damage due to phase faults, and are particularly suitable for applications on heavily loaded lines. A variable offset eliminates the possibility of "undesirable trip-outs". They also provide back-up protection for adjoining line sections.

For the best in relays, rely on Westinghouse leadership in relay engineering.

YOU CAN BE SURE...IF IT'S Westinghouse

B. I. Hayford, Mgr., Metal-Clad Switchgear Engineering, with an array of Redarta components now providing Westinghouse metal-clad switchgear with the industry's most effective insulation.

FACT:

Highest protection standards achieved for metal-clad switchgear

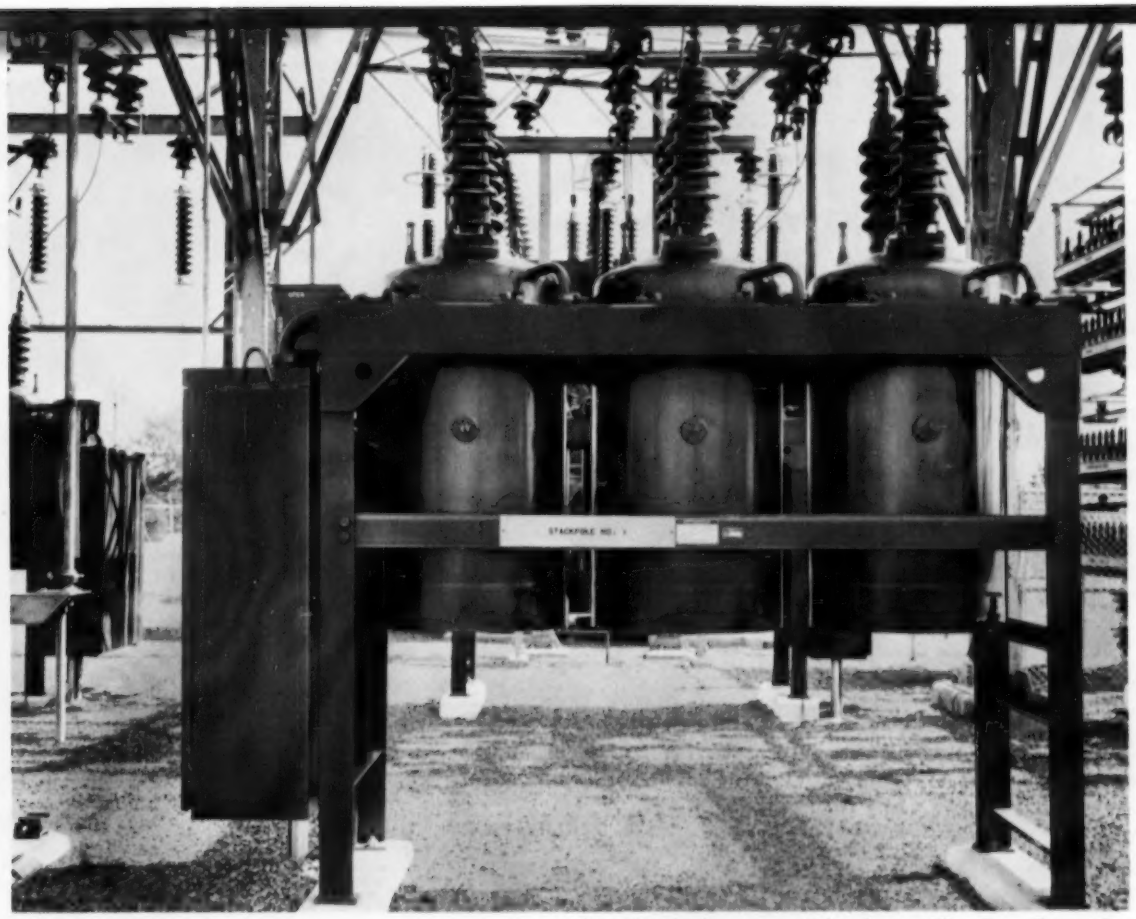
Flame-retardant Redarta . . . from bus through arc chute to disconnect bushing, new Westinghouse Redarta has proved the most versatile metal-clad switchgear insulation obtainable. Laboratory tests prove Redarta slower to ignite and rapidly self-extinguishing, thus preventing fire from spreading to adjacent compartments. Mechanically, Redarta is stronger than all other fibrous insulating materials used for high-voltage applications. Fire-retardant Redarta has been established through exhaustive experimentation and testing as the best all-around insulation for metal-clad switchgear.

Westinghouse exclusive De-Ion® arc quenching—arcs are driven swiftly into arc chutes, de-ionized and extinguished. This means less contact burning, less chute wear, longer breaker life.

Bonderizing—five-dip treatment provides a rust- and corrosion-resistant finish, and furnishes a perfect base for painting.

There's more to the story—get your facts from The Man With The Facts, your Westinghouse sales engineer.

YOU CAN BE SURE...IF IT'S Westinghouse



New Westinghouse type G breakers at West Penn Power Co., St. Mary's Carbon Center substation.

FACT:

Four major features make new type G breakers best performers available

The new streamlined Westinghouse line of type G, frame-mounted circuit breakers, 14.4 through 69 kv, retains these 4 major features, proved in service.

Type AA pneumatic mechanism—exclusive design, completely self-contained . . . provides mechanically and electrically trip-free opening, and ultra-high-speed, shock-free reclosing. Meets requirements of all breakers produced or contemplated today—to 330 kv and beyond.

Type S condenser bushing—the first to meet fully the new ASA industry standards, still retains the successful solder-seal construction. The Westinghouse type S has piled up a unique record of 758,000 bushing years in use with a 99.9834% perfect service record.

De-ion grids—a Westinghouse exclusive, thoroughly proved in many years of service in thousands of breakers.

Interrupting ratings—completely verified in High Power Laboratory tests.

A. W. Hill, Mgr., Power Circuit Breaker Engineering, discusses type G breaker design details with The Man With The Facts.

FACT:
Coastal Finish doubles paint protection of power transformers

Coastal Finish—the exclusive Westinghouse mica-base paint system that doubles distribution transformer paint life—is now the standard finish on all Westinghouse power transformers.

Originally developed for the severe atmospheric conditions of seacoast areas, Coastal Finish is an all-purpose coating with unequaled durability under all service conditions. It withstands moisture, oxygen, acids, alkalies and ultra-violet light—will not flake or crack under action of temperature extremes—has excellent coverage on sharp edges. Tests under severe atmospheric conditions prove that Coastal Finish lasts twice as long as other power transformer finishes.

Power transformer tanks are first cleaned by shot blasting, then prime-coated with a zinc-chromate, iron-oxide primer. Coastal Intermediate (mica flakes in modified phenolic and alkyd resins) is then flowed on, followed, in like manner, by a high-gloss ASA-24 gray finish paint. Prior to shipment, transformers are completely spray-coated with the finish material. This provides a durable film thickness of three mils or better.

So protected, Westinghouse power transformers bring to your substations a degree of corrosion protection never before available. This contributes not only to over-all station dependability, but to substantially lower maintenance costs.

WEATHERING TESTS PROVE THE ALL-AROUND SUPERIORITY OF COASTAL FINISH OVER STANDARD FINISH

Finish	Salt Spray 1000 Hours	Acid Resistance 0.5% HCl . . H_2SO_4	Alkali Resistance 0.5% NaOH	Weatherometer 6 Weeks
Standard 100°C	Rusting around identifying numerals	No apparent change after 250 cycles	No apparent change after 250 cycles	No apparent change
Standard 150°C	Heavy rusting around numerals and at edges of panels	No apparent change after 250 cycles	Two top coats eaten away exposing primer after 250 cycles	Fading but no corrosion
Standard 200°C	Panel 50% rusted and peeling	Completely stripped off and rusted after 126 cycles	Completely stripped after 24 cycles	Badly faded with heavy chalking. Edge corrosion
Coastal 100°C	No evidence of corrosion	No apparent change after 250 cycles	No apparent change after 250 cycles	No apparent change
Coastal 150°C	Very faint rusting around numerals	No apparent change after 250 cycles	Faded but film intact. No corrosion	Fading but no corrosion
Coastal 200°C	Very slight numeral and edge corrosion	Faded appreciably but film intact and no corrosion	Finish coat eaten away after 120 cycles. Intermediate coat apparently untouched after 250 cycles	Badly faded with heavy chalking. No corrosion

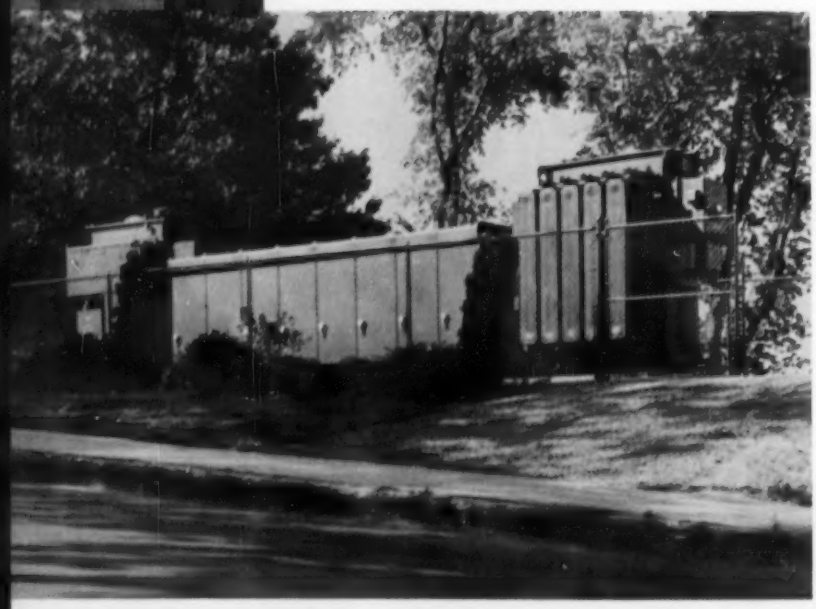
Note: 100°C, 150°C and 200°C indicate that panels were aged one week at these temperatures before making above tests. One cycle in acid and alkali tests consists of 2 hours' immersion and 2 hours' air exposure.

YOU CAN BE **SURE**...IF IT'S Westinghouse

John Cross, Manager of Power Equipment Sales, discusses the application of Coastal Finish to power transformers.

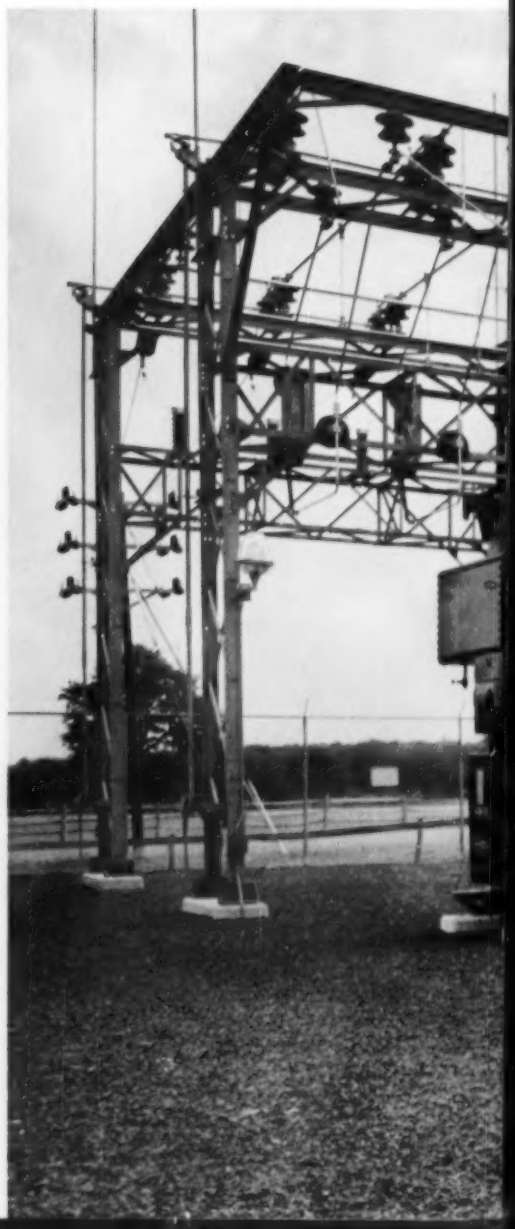
FACT:

Coordination of equipment in unit substations provides maximum reliability of power supply



4,000-kva spot network substation with in-line single bus. Note compact, attractive appearance.

Westinghouse unit substation recently installed at Hartford Electric Light Company.



YOU CAN BE SURE...IF IT'S

Westinghouse

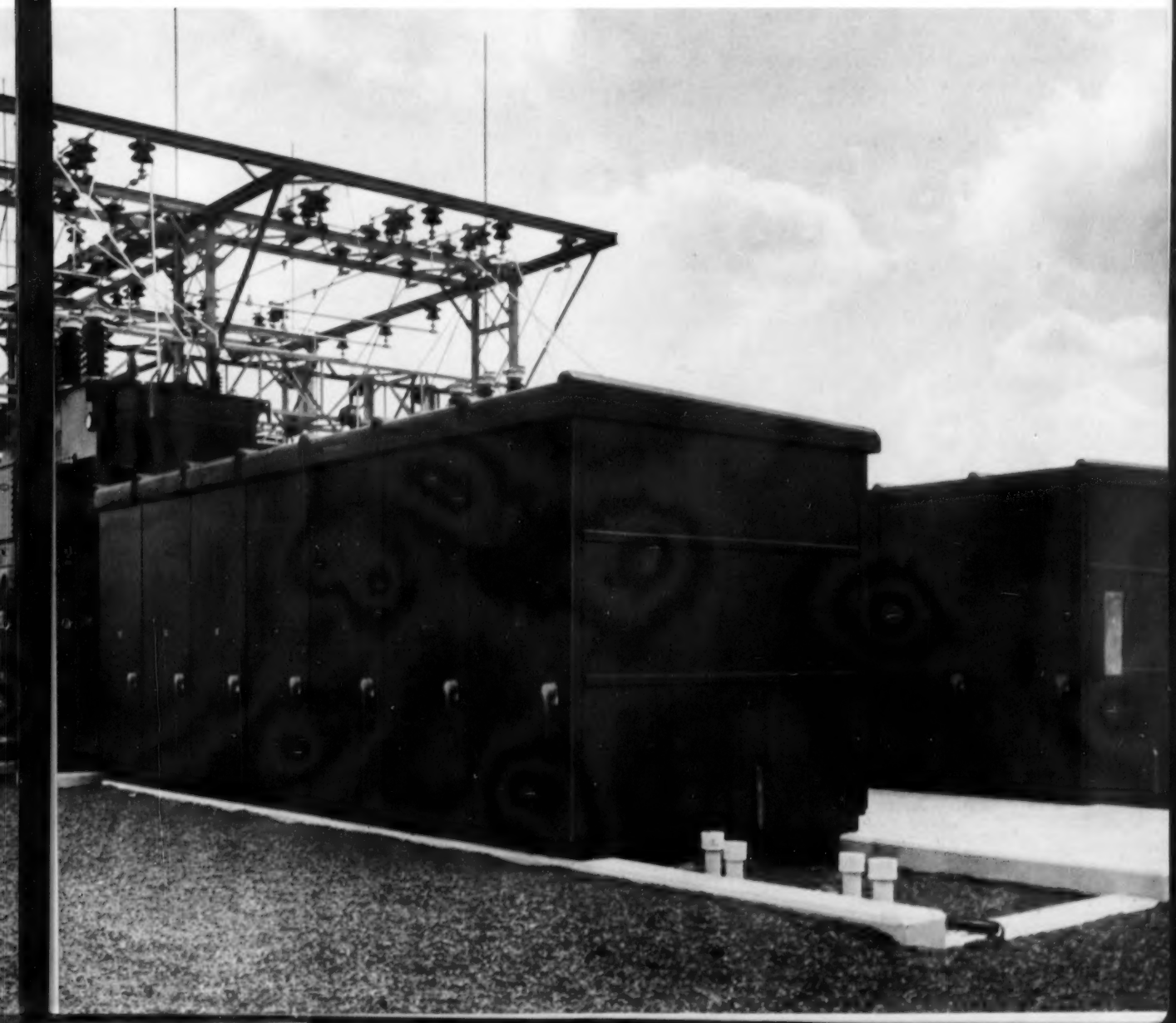
The ultimate in distribution substation dependability is the Westinghouse unit substation. Here's why:

Equipment components that transform, regulate, relay, switch and protect are coordinated—engineered to fit and work together . . . from design through installation.

Products are assembled to give you, in a compact unit, the most dependable operating arrangement, with controls located to provide rapid access. Automatic control for tap changers, for instance, is housed in a cabinet mounted at convenient height on the side of the transformer.

All basic components, built to do a coordinated job, have proved reliable in long service. DH air circuit breakers, for example, employing the principle of De-ion arc quenching, have effectively lengthened breaker life, reduced failures and maintenance to a minimum.

Responsibility for design, engineering, manufacturing and installation resides with one organization of long experience. Complete reliability is the result of not one but all these factors in Westinghouse unit substations.



From specification to substation, Westinghouse engineering helps you achieve dependability

Regardless of the type of substation you plan to build, Westinghouse offers you an unequaled depth of engineering talent to assist you every step of the way:

Product Design Engineers . . . to coordinate components of individual pieces of apparatus.

Utility Industry Engineers . . . to help coordinate all the apparatus used in the station.

Service Engineers . . . available to help supervise installation and testing.

This talent pool is marshaled to your assistance—teamed with your own engineers and consultants, by your local Westinghouse sales engineer . . . your prime contact with Westinghouse.

What do you gain from all this? Less engineering and purchasing, faster delivery, easier installation—to name a few obvious advantages. More important, you benefit from a total engineering experience gained in countless substations of every type, rating and complexity—experience that assures you a better, more dependable substation, with a minimum investment of your own time and money.

GET ALL THE FACTS.

Call The Man With The Facts . . .

YOUR WESTINGHOUSE SALES ENGINEER

YOU CAN BE **SURE** . . . IF IT'S

Westinghouse

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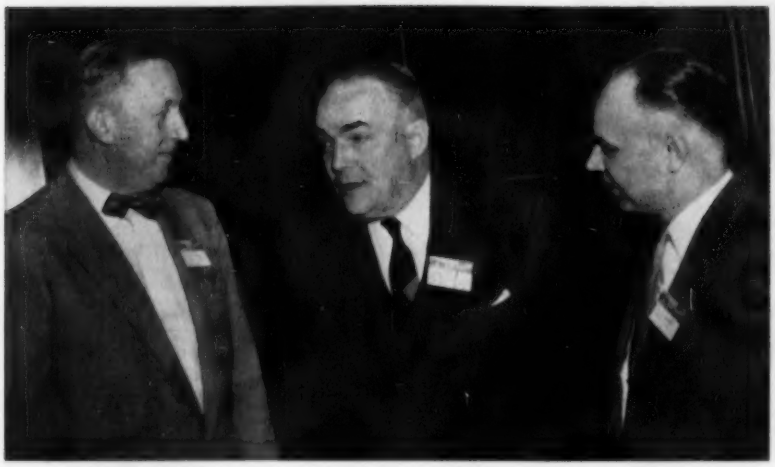


Setterstrom Naughton Brissenden

NWEL&PA Sales Turn On the Heat

Whatever direction electrical industry sales effort takes, it runs into the roadblocks of wiring. It was natural, then, that one dominant subject permeating all sessions of the 30th annual sales conference of the Business Development Section, Northwest Electric Light & Power Assn., at Hotel Utah, Salt Lake City, May 9-11, was wiring. Another was that Association President R. C. Setterstrom, Montana Power Co., after a year of study of the association's functions, set forth a challenge to the membership to choose the route ahead. His conclusions were that the NWEL&PA should "do a lot more talking, as the public power people do on their side, to sell private power."

"It wasn't the public power boys who did the pioneering in this industry, even if they now try to take credit for it. You are the kind of people who have built the industry today and I don't see any reason to be ashamed of our record or be afraid to talk about it."

Besides these two dominant notes—wiring and public recognition of private power—the three-day meeting crammed into three bureau and two committee parallel sessions as much of the present scope of the sales picture in the industry today as time and speakers would permit. These were sandwiched between two general sessions, the first and last mornings, and spiced by two all-group luncheons on Monday and Wednesday.

The scent of forthcoming gas seeped into all of the sessions as plans were discussed to meet the natural gas competition threatening the Northwest next year.

Carrol W. Brissenden, Portland General Electric Co., section chairman, noting that the days when salesmanship in the industry had been at a low ebb were past, opened the meeting with the thought that if those in sales, advertising and rate research sell all-electric living, not only for the home but for commerce and industry, greater benefits will accrue to neighbors and friends. The future of the industry, he said, depends upon the selling decisions generated in a conference of this type.

Mayor Earl J. Glade of Salt Lake City paid high tribute to Utah Power & Light Co. for making it "the best lighted city in the world," and the growth in new pay rolls and prosperity that electricity and water had brought to the region. In response, Edward M. Naughton, president, Utah Power & Light Co., offered hope that the new federal power policy of partnership with local agencies and nuclear energy would bring still greater progress to the Northwest in the future. He outlined the 16 hydro projects in which private companies have asked to build and told what the industry was doing in the field of nuclear power development.

It was then that Setterstrom set forth the three courses facing the association when Berkeley Snow, executive manager, retires in a year from now. These courses, he said, were to continue the organization as it is today, "talking to ourselves," or dissolve it to permit the Far-Western companies to join PCEA and the mountain companies RMEL, or strengthen the present association, continue it, but dedicate it to the selling of private power.

Dr. ElRoy Nelson, former University of Utah professor of economics, now vice-president of First Security Corp., after outlining the optimistic trends in consumer demand — home building, industrial growth, consumer income, etc.—reviewed some of the "buts." Among these were possible increase in consumer price index, monetization of mortgages, income tax reductions which would further prevent stable currency and tightening of credit. He also expressed concern that, despite increases in production, industries have not employed more people.

Down-to-earth reasoning of the successful type of farmer was brought to the first Monday luncheon by Frank G. Shelley, executive secretary, Utah Farm Bureau Federation. It was presided over by J. E. Cushman, vice-president, Utah Power & Light Co., who had worked with him on rural electrification for years. Shelley enumerated the documented beliefs expressed in the farm bureau's policy if the farmer is to have high income without loss of personal freedom. Among these beliefs are a competitive enterprise system, proper rewards for initiative, respect of property rights, the constitution as basic law, impartial government, minimum controls and aids, voluntary cooperation and that monopoly of any kind is dangerous. He made a plea that the Benson program of flexible price supports be given time for a fair trial, as its aim is to equalize the economy of agriculture instead of regiment it.

One dynamic program to anticipate the wiring needs of the future, instead of racing to catch up with public need after the house has been underwired, was a fitting climax to the parallel-session discussion of this problem. This was presented at the final general session Wednesday morning by Gordon DeFoe, general sales supervisor, and Harold V. Wright, wiring and kitchen planning specialist, Washington Water Power Co., and approved by James Paxton, chief electrical inspector of Spokane. They outlined the industry-wide steps and committee work leading to a new ordinance in Spokane requiring service entrance conduit and meter socket capacity for 200-amp minimum. (A detailed story on this will appear in another issue shortly.) Loss of more than $100,000 in appliance sales in six months because the customers could not use the new equipment in their homes made that area conscious of a need for action. Quick recovery water heaters and high watt-

You just can't miss with

Tiger Brand

Electrical Wire and Cable

Varnished Cambric

Tiger Brand Varnished Cambric Cable is the most economical way to transmit large blocks of power short distances.

Amerclad

To withstand physical abuse, moisture, sun and oil, use Tiger Brand Amerclad for all sorts of portable equipment.

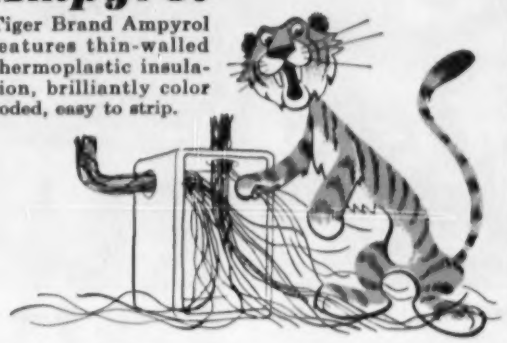
Amerbestos

Tiger Brand Amerbestos is a true *quality* heat resistant material. The asbestos is *felted* for greater durability.

Submarine For underwater power distribution, there's a Tiger Brand Submarine Cable to withstand any operating condition.

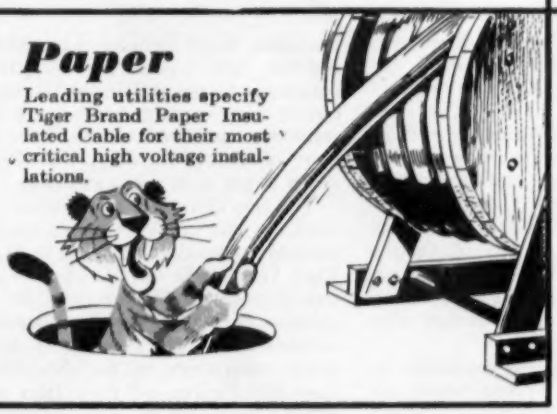
Ampyrol

Tiger Brand Ampyrol features thin-walled thermoplastic insulation, brilliantly color coded, easy to strip.



Paper

Leading utilities specify Tiger Brand Paper Insulated Cable for their most critical high voltage installations.



American Steel & Wire *specializes* in wire and cable that must withstand abusive service. No matter what kind of operating condition you may have, there is probably a *standard* Tiger Brand Wire or Cable that will give you better service than you ever dreamed of.

Send the coupon and outline your problem. We'll see that you get service—*fast.*

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB

- asbestos wire and cable
- mold cured portable cord
- aerial, underground and submarine cable
- shovel & dredge cable
- paper & varnished cambric cable
- machine tool & building wire
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SEND THE COUPON

American Steel & Wire
Room JE-65, Rockefeller Building
Cleveland 13, Ohio

● Please give me more information about Tiger Brand Wire & Cable for .....

Name.....
Firm.....
Address.....
City.....State.....

U·S·S Tiger Brand ELECTRICAL WIRE & CABLE

UNITED STATES STEEL

Skelton Butler Horrom

Johnson Belnap Dimmitt

age dryers have made even 100-amp service obsolete.

Virgil A. Warren of the advertising agency of that name, Spokane, spoke to the other theme of the conference—selling the private electric industry to the public. "One thing that confuses the public," he said, "is who is on your team. When people in private industry do not come out clearly that they favor private power, the public doesn't know what to believe." Saying that the public power groups play rough and use every means of communication to tell their story, he urged that the private power people learn to use communications to tell their story. Recent studies of high school students' attitudes, which he recited, indicate a meager understanding of the business system. These are the people, he said, who will become the voters that decide on public issues. "Yours is a big responsibility," he concluded. "The stakes are high—but a free America embracing private enterprise, the profit system, and continued incentive are all worth fighting for."

A similar message closed the conference at the final luncheon, when Dr. James Fifield Jr., leader of the "Spiritual Mobilization" drive, pastor of First Congregational church, Los Angeles, spoke. After showing the decadence of freedom and the growth of collectivist thinking, he said that the future of free enterprise cannot be taken for granted. It can be saved if enough people care enough about it to redeem it. He urged that all salesmen "add freedom to your line. If you are just selling power alone, you will soon be out of business." He felt there is still a chance to reach the working people, who love their country, have served it and have often been betrayed by their unions.

If inspiration comes from the general sessions, methods, techniques and practical ideas pour forth from the bureau and committee sessions. Each had a well-timed range of subjects, handled by experts in their field.

Commercial & Industrial Bureau
O. J. Horrom, Chairman
Wayne L. Shaw, Vice-Chairman

Methods of acquainting commercial and industrial customers with new electrical processes and techniques were discussed by B. J. Martin, publisher of *Electrified Industry*, Chicago. He covered direct mail of various types, as well as publications, and answered questions during the discussion period that was provided after each subject.

The heat pump was explained by Frank W. Jordan, Westinghouse, Air Conditioning Division, San Francisco. William U. Dent of the same company followed a new color movie on induction heating with very practical experience data on numerous applications of both induction and dielectric heating.

A comprehensive sweep of commercial lighting applications and methods as well as new light sources was given by G. B. Buck II, General Electric Lamp Division, Denver.

An effort to clear up some of the confusion in street lighting brought about by light sources—incandescent, mercury vapor, fluorescent—circuiting and ballasts, luminaire types, photometry curves and illumination values was made by Stacy Standley, product manager, street lighting, Line Material Co., Milwaukee. The company's constant wattage and uni-ballast series circuit were explained in some detail since these new methods have been the cause of some of the confusion. Copies of his paper were made available.

Snow Huckins

The new in interior distribution systems, the 480/277-Y v systems, was explained in considerable detail by H. D. Kurt, General Electric Co. power system engineer of Schenectady. In the question period following, applications to many local problems were discussed. Some companies in the Northwest have installations on their lines and others were eager for experience data, since the system offers copper savings and better operation in large or scattered buildings, such as schools and industrial and commercial buildings.

An extremely able specialist in industrial electric heating applications was W. E. Eyth of Edwin L. Wiegand Co., Pittsburgh. Following a movie and numerous slides showing applications, he was quick with answers as to data and techniques.

Electric Home Bureau
J. F. Skelton, Chairman
F. A. Tool & Sally Robbins, Vice-Chairmen

Each of the three sessions of this bureau covered an important phase of home electrification. The first afternoon was on lighting, the second session covered water heating and home service activities and the final session was devoted to wiring.

A Salt Lake City dealer, Mark Brown, opened the program by a constructive talk, "What the Utilities Can Do to Promote More Sales Through the Dealer." (For his complete talk, see p 103.)

The lighting performance was a two-part show. In the first, Mrs. Vilate White, home service supervisor, gave the first public performance of a presentation prepared by Utah Power & Light Co. for use among audiences of schools, women's groups, fairs, shows,

EVERYBODY'S SELLING!

For the first time in almost 15 years, SELLING is the by-word wherever electrical people gather.

SELL wiring, SELL appliances, SELL service—SELL, SELL, SELL! 4000 active leaders of the industry, representing some 300 member companies, are finding that the PCEA meetings afford an excellent opportunity to

1. Pick up new sales ideas
2. Learn how to avoid mistakes that others have made

They are also finding that PCEA committees are a very effective tool for promoting the DO IT ELECTRICALLY idea to cultivate the field and make it more productive for individual sales efforts.

If you are not already a member, you will get real value from participating in PCEA programs and activities. Call or write either of the offices for full details.

"Assocations do those things which most people think just happen"

PACIFIC COAST ELECTRICAL ASSOCIATION

530 West Sixth Street, Los Angeles 14, California, Tucker 5610 • 681 Market Street, San Francisco 5, California, Douglas 2-1556

etc. With three double-sided display boxes, a suggestion of a front porch, living room, bath room, kitchen, dining room and bedroom was illustrated. By means of switching, actual lighting of these various rooms was explained in a manner that should be completely understandable to the public. These lighting boxes are portable and designed to be taken through the UP&L system, just as its lighting demonstration was during the past two years. (Story coming soon.)

Second act was that of Mary Webber, General Electric Lamp Division residential lighting specialist from Nela Park. She illustrated with colored slides and actual equipment some of the dramatic and appealing possibilities for converting gardens to outdoor living areas by cleverly placed lighting equipment. Several model installations made by General Electric were shown to indicate the potentials.

Montana Power company's experience in attempting to sell portable lamps in a mail order campaign was told by Leonard Regan of that company. While some considered the 3,000-lamp total disappointing, he felt that it was reasonably satisfactory and would have been better had not it been launched during the time the post office department allowed mailings to box holders without addressing and the public was flooded with direct mail literature.

Quick recovery water heaters may prove the factor to keep water heating electric in the high saturation areas when natural gas comes in. Hence the program of Washington Water Power Co. for the conversion of existing water heaters, as described by W. A. Lowry of that company, commanded intense interest. He described the situation and the steps by the company to anticipate the problem. (This paper will appear in a subsequent issue.)

R. B. Day of General Electric, Louisville, spoke of the decline in sales of the electric water heater while all else is in an expanding market. He discussed some of the complications in codes and restrictions, as well as the 273 varieties demanded by different utilities throughout the country. He made a plea for standardization on a quick recovery 40-gal heater in order that its price could be kept competitive.

How television has enabled Idaho Power to reach an audience of 18,000 out of a set total of 47,000 in its area, with its afternoon shows, was described by Sally Robbins, home service director of that company. Where cooking schools reach a hundred or two, TV audiences number thousands and the intimacy of the program makes the viewers feel that they know the company's home economist personally. She likewise described tie-ins with some of the company's "Wife Saver" campaigns on specific appliances with dealers.

Lowry Robbins

Shipp Bollinger

This was followed by a live home service telecast of Utah Power & Light Co., in which Mrs. Virginia Wells gave a home service demonstration and Wayne F. Mulcock a five-minute informal talk on some phase of adequate wiring.

Wiring filled the complete Tuesday afternoon session as Norman Wicks, manager, National Adequate Wiring Bureau, New York, told of the new awareness everywhere of the need for intense action on this front. That the industry is up against the "buzzsaw" was proved statistically and then he told of the combined efforts of the national industry associations — EEI, NAED, NECA and NEMA—to coordinate promotions through NAWB. That specialty selling is a must for wiring and that trained salesmen must be put in the field, he emphasized strongly. Of financing plans by utilities or banks, he said that it is definitely known that merely announcing such plans is not enough. They have been available for years from the banks and nothing happened. Each step of the path must be plainly marked for dealer, contractor and the public to make such programs successful.

What National Electrical Contractors Assn. is doing on this wiring front was shown by Joe Bollinger, field representative, District 8, Helena, Mont. With national figures of appliance manufacture, he illustrated what this represented in generating capacity, transformers, substations and finally wiring, if it is to be utilized by the public.

The Parade of Homes staged in several areas was described by Earl P. Staten, executive vice-president, Utah Home Builders Assn., Salt Lake City, with particular reference to the 22 homes built by 17 builders in that city last year. He felt that such promotions were a natural field for the all-electric home.

Rural and Farm Bureau
T. Karl Dimmitt, Chairman
Jay S. Gardner, Vice-Chairman

For so vital a subject to the Northwest utilities, the attendance at this bureau was not only disappointing to the speakers but hazardous to the future of this segment of the business, the chairman felt. Although the program proved technical in some cases, the importance of the subjects and their relation to the power suppliers will need a better appreciation by management.

Pump troubles and testing was discussed by R. P. Bakes, Washington Water Power. Both the public relations and the load-keeping aspects of a thorough pump testing program was discussed. The tests provide company representatives with factual data on which to make suggestions and recommendations regarding types of irrigation and then the customer decides. The service is not one of engineering an irrigation system for a farmer but of providing him information.

The limitations as well as the advantages of sprinkler irrigation were discussed by Claude H. Pair, Agricultural Research Service, USDA, Boise. Such conditions as wind, weeds and overwatering, as well as cost of installation, have to be balanced against ditch irrigation.

"Relationship of Soil and Moisture to Growing Crops," the results of work over some period of time done by Portland General Electric Co., was presented in a paper by Frank Mackaness and Larry Rowse and given by the latter, with actual soil test demonstrations, at the final session. The findings of this company have an important bearing on irrigation methods and consequently on power applications to pumping.

"Development of High Analysis Fer-

Protect your Customer..

AS WELL AS YOUR EQUIPMENT

with low-cost, dependable

KEARNEY

TRIP-O-LINK FUSE CUTOUTS

These simple and practical fuse cutouts are economical to install and easy to service. The Trip-O-Link fuse link combines the fuse and cartridge in a single, replaceable unit. Inside the fibrelined cartridge the arc is extinguished less than a cycle after interruption. When the fuse blows, the spring tension holding the fuse is released, speeding arc interruption.

The easy-to-catch contacts exert 30-40 lbs. grip on the fuse cable, but the vertical pressure exerted by spring tension is only 3½ lbs. You get high-pressure contacts without excessive strain on the fuse element.

JRK 281W

For Better Construction...Safer Maintenance

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. GUELPH, ONT.

Specify **KEARNEY** *The Mark of Quality* **PRODUCTS**

MAYDWELL & HARTZELL, *INCORPORATED* • **WEST COAST DISTRIBUTORS** • Los Angeles • San Francisco • Portland • Seattle • Spokane • Phoenix

Nominees for next year's Business Development Section officers: Front row—Al Gilbert, Idaho Power Co., vice-chairman; K. I. Jack, Washington Water Power Co., chairman; Sally Robbins, Idaho Power Co., Electric Home Bureau vice-chairman; Jay S. Gardner, Telluride Power Co., chairman, Rural and Farm Bureau. Back row—Frank Tool, Washington Water Power Co., chairman, Electric Home Bureau; Carrol W. Brissenden, Portland General Electric Co., section past chairman; Wayne L. Shaw, Utah Power & Light Co., chairman, Commercial and Industrial Bureau; and Berkeley Snow

tilizer" was brought to the meeting by Frank M. Crotts, Wichita sales manager of Colorado Fuel & Iron Corp., which operates its Spencer Chemical Division there. A moving picture showing the processing of ammonia followed his discussion of fertilizer characteristics and applications.

Advertising & Publicity Committee
Randall Johnson, Chairman

A closer look was taken at the function of the publicity department by this group, as it admitted that many jobs were being attempted by advertising that should first be tried by publicity; that sometimes the effort to put out objective unslanted news failed to get the management story to the public. There is nothing to lose, it was said, by making institutional movies hard-hitting messages instead of mere series of pretty pictures. An outstanding film, "Citizen Dave Douglas" of the Tax Equality Assn., was shown to illustrate this point. Jack Foley of Pacific Power & Light described his company's method of solving the parade-float problem by building a portable float that was used 35 times last year in various civic parades.

Building dealer interest is often frustrating, since the dealers do not always react the way they are expected to do, but in experience it has been found worth the money and effort applied to it.

The group nominated Fred Kempe of Portland General Electric for its next chairman.

Rate Research Committee
J. H. Butler, Chairman

This group, representing five companies, had 18 other visitors, attesting to the importance of rates in the minds of the salesmen.

Possible impact of gas competition on the electrical load in the area came in for considerable discussion. Other topics covered included handling of service to trailer courts, residential load factor and the lack of statistics therefor, block-type residential rates—whether obsolete or not. No conclusions or recommendations were made until further study. Also discussed was the high wattage quick recovery water heaters but, lacking data, it was urged that research be done to determine the effect on feeders. Some companies have connected these water heaters with the provision that, after tests have been run, some changes in rate may be forthcoming.

Fred R. Groch, Portland General Electric Co., was nominated as chairman for next year.

Executive Committee

Nominations to the board of directors for next year's officers approved at the executive committee session were: for chairman, Kimball I. Jack, Washington Water Power Co.; vice-chairman, A. S. Gilbert, Idaho Power Co.; chairman of the Commercial & Industrial Bureau, Wayne L. Shaw, Utah Power & Light Co.; Electric Home Bureau, F. A. Tool, Washington Water Power Co.; Rural & Farm Bureau, Jay F. Gardner, Telluride Power Co.

Also recommended was that a home economist be named as a vice-chairman of the Electric Home Bureau and that the selection be coordinated with the selection of vice-chairman and committee chairman.

Discussed was a joint meeting with the personnel and safety section and a recommendation for an invitation for such a meeting was voted. Resolution that the association dedicate itself more to the expression of the contribution of the private power companies was recommended to the board of directors. Also recommended was that a clearing house committee on electric heating be formed and that next year's program carry a program feature on area development.

A visit to the George M. Gadsby steam plant of Utah Power & Light Co. followed the last general session. Social activities included entertainment at a banquet and a ladies' luncheon. Arrangement committees under General Chairman W. A. Huckins, Utah Power & Light Co., received high praise for smooth running handling of all details for the conference. Total registration was 193 and attendance at the banquet was 274. On Huckins' committees were Lawrence E. Jenkins, treasurer; Nell McCarrel, chairman registration and hotel reservations; general arrangements and properties—Commercial & Industrial Bureau, J. Homer Shaw and Wayne L. Shaw; Electric Home Bureau, Evelyn Hansen and D. L. Holt. Manufacturer-distributor entertainment committee, R. S. Belnap, General Electric Supply Co., chairman; ladies' entertainment, Mrs. W. A. Huckins, chairman; publicity, Will W. Bowman.

• **Three more** important conferences were covered by the editors during May but will have to wait until the July issue for a more complete report. In Denver, May 17-20, the first Western meeting of the Appliance Parts Jobbers Assn. was held, attended by members from five Western states as well as from the entire nation. Some highlights are touched upon in the Sales Guide News Letter. Then the Engineering and Operating Section of the Northwest Public Power Assn. met at Longview, Wash., May 19-20. A report on it will be made in the July issue. In San Francisco on May 26-28 the joint annual conference of Districts 6 and 8 of National Electrical Contractors Assn. was held. Some highlights of it are mentioned in the Contractors' News Letter in this issue; the complete report will be carried in the July issue.

Miss Jan Golus, San Diego's Miss Light's Diamond Jubilee, poses with a handful of chicks and a 1914 incubator (below) and a 1954 model (above), to illustrate the progress made in this type of farm electrical equipment. Incidentally, the glass incubator shown was built in San Diego County by Lyons Electric Company for His Majesty, the King of Thailand, and left for its new home in Siam the day the picture was taken.

. . . SINCE 1911, San Diego County farmers have been assigning more and more tasks to Reddy Kilowatt, until today there is hardly a major farm operation that cannot be done better, faster and cheaper with the help of electricity. . . . The San Diego Gas & Electric Company, today, as in the past, continues to keep local farmers well informed of the latest in electrical equipment through testimonial-type display advertising in farm publications and a twice-daily radio program, "Home on the Ranch".

SAN DIEGO GAS & ELECTRIC COMPANY

Public Agencies Urged to Develop Own Power

"Power needs of the Pacific Northwest for the next 10 years will require an investment of at least $3,500,000,000 for new dams, transmission facilities and projects now under way," Byron L. Price, assistant Bonneville Power administrator, told the annual meeting of the Northwest Public Power Assn., held at Eugene, Ore., April 20-22. He said BPA can supply firm requirements of distributors through 1961-62 under median hydro conditions on scheduled generation capability, but privately owned utilities then will face rapidly rising deficiencies, approaching 300,000 kw a year unless new generation is constructed.

Price urged public agencies to seek more energy supply on their own. "Each and every kilowatt of generation developed by a preference agency will result in that much less drain on federal power upon which many of you are depending to meet your future requirements," he said. "It is clearly in our mutual interest to cooperate with those agencies who have possible projects and financing ability to develop generation on their systems." His comment was interpreted also as an appeal for the public agencies to look more favorably upon the Eisenhower partnership power policy.

Price announced that Administrator Pearl was reactivating the regional advisory council that had been inaugurated by his predecessor, Dr. Paul J. Raver. This organization, consisting of appointive members who met on an area basis as well as holding semiannual regional sessions, will likely be smaller than the previous council. The purpose would be unchanged from the earlier council, which reviewed power problems and advised the administrator.

Price reported BPA had completed its reorganization, eliminating duplicating functions, and that staff increases will reflect increased operations from new generation and customer service and supply. "The plan is to level out our staff requirements by contracting more of the fluctuating workload of surveys, design and construction and at the same time meet the normal growth workload by increasing the staff," he said.

William E. Johnson, general manager of the Hanford Atomic Project, predicted the peaceful utilization of atomic energy would change the world within the lifetime of many oldsters and not in the distant future. "We're going to see one of the greatest worldwide revolutions—evolutions—that has ever been seen," he declared, and explained that nations like India who lack adequate conventional power resources, oil, coal and sufficient hydroelectricity, will develop atomic-powered generation. But he said the U. S., with ample other resources, would not take to atomic-power generation as fast as some nations. "It's purely a matter of economics," he said. He predicted a timetable of atomic power in the U. S. would see 2% of annual generation produced by atomic power by 1965 and 65% of additions will be atomic by 1980. Johnson quickly added, however, that other types of generation would also increase their percentages.

Other speakers included Paul J. Raver, now superintendent of Seattle City Light; C. W. Nash, director of load development for the British Columbia Power Commission; Col. L. H. Foote, North Pacific division engineer, Corps of Engineers. Foote reviewed current Columbia system construction.

The association, by resolution, reaffirmed its preference for federal development of the Hells Canyon site on the Snake River. It did not take up the John Day question, although directors of the Washington State Public Utilities Districts Assn. called for immediate federal construction of the lower Columbia project and criticized the federal government for "standing idly by while public agencies and private companies are doing their part" in development of power resources. The directors said John Day faces "fewer obstacles than any other dam authorized for construction by the federal partner."

Ora E. Beasley, Sandpoint, Idaho, was re-elected president. Spokane was chosen for the 1956 meeting.

Dispatchers Meet

Two evening sessions and an inspection tour constituted the semiannual meeting of the American Power Dispatchers Assn., held in Los Angeles April 29-30. J. W. MacPherson, C. C. Moore & Co., presented a color film, "Steam for Power," and with slides discussed modern boiler design.

An inspection tour was made to the Redondo Nos. 1 and 2 plants of the Southern California Edison Co.

C. N. Alldredge, dispatcher for the Bonneville Power Administration, discussed operation of the Northwest Power Pool and explained how the association had increased the efficiency of dispatchers in the Northwest.

At a business meeting presided over by R. W. Mort, president, Charles Camp was elected national publicity director; R. F. Davis, secretary-treasurer; P. B. Bengtsson, vice-president. R. W. Mort was re-elected president. A committee was appointed to prepare for the national meeting in October.

1955 Association Meetings Scheduled

June

6-10—**National Industrial Service Assn.** national convention, Hotel Statler, Los Angeles.

13-16—**Edison Electric Institute** national convention, Hotel Statler, Los Angeles.

22-24—**NWEL&PA, Accounting & Business Practice Section,** Hotel Vancouver, Vancouver, B. C.

27-29—**Canadian Electrical Assn.** national convention, Vancouver, B. C.

July

12-14—**Western Plant Maintenance and Engineering Conference and** show, Pan Pacific Auditorium, Los Angeles.

August

15-16—**American Institute of Electrical Engineers,** Hotel Finlen, Butte.

24-26—**Western Electronics Show and IRE Convention,** Civic Auditorium, San Francisco.

September

11-14—**Rocky Mountain Electrical League** annual convention, Grand Teton Hotel, Jackson Hole, Wyo.

12-14—**International Association of Electrical Inspectors, Northwestern Section,** Bellingham Hotel, Bellingham, Wash.

19-21—**International Association of Electrical Inspectors Southwestern Section** annual meeting, Mission Inn, Riverside.

26-28—**National Association of Electrical Distributors,** Empress Hotel, Victoria.

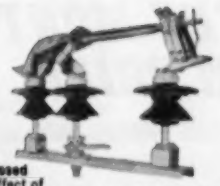
October

1-8—**Northern California Electrical Bureau,** Electrical Exposition, Oakland Civic Auditorium.

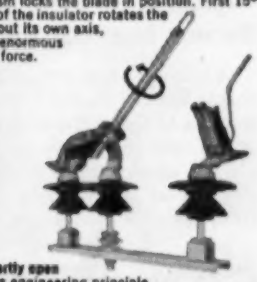
November

9-10—**PCEA-Hawaiian Section,** Honolulu.

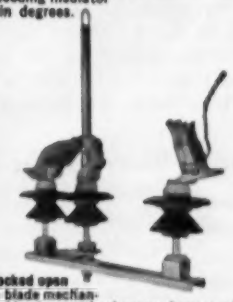
The blade of the MK-40 switch is actuated by a 45-degree bearing mechanism which replaces cranks, levers, links and cams. It converts motion of operating insulator to a vertical lifting and rotating motion of the blade, with smooth sequence and complete control at all times.



Switch closed
Toggle effect of mechanism locks the blade in position. First 15° rotation of the insulator rotates the blade about its own axis, exerting enormous leverage force.



Switch partly open
Ingenious engineering principle effects blade rotation, with the blade rise in degrees exceeding insulator rotation in degrees.



Switch locked open
with the blade mechanism knuckle pin over dead center. Leverage force again breaks ice accumulation or corrosion easily.

simplified, powerful blade mechanism

for smoother operation, longer service with MK-40 Air Switches

Only DELTA-STAR MK-40 Switches offer all these additional advantages

- Visible high pressure silver inlayed hard drawn copper contacts at both ends of switch blade. Independent pressure applying non-ferrous leaf springs assure constant pressure. Heavily constructed with a minimum number of current interchange surfaces to withstand high short circuit currents.
- These switches have the same simple basic design in all rated sizes: 7.5 kv to 380 kv. 400 to 5000 amperes.
- Greaseless non-rusting rotating insulator bearings.
- Fully adjustable operating mechanism parts with pipe piercing set screws to eliminate slippage.

This close look at the MK-40 blade mechanism demonstrates another reason why this DELTA-STAR Air Switch is your standard of comparison.

The MK-40 is the result of a search for engineering simplicity and maximum efficiency. Only three moving parts are employed. No cranks, levers, links or cams are used. Factory sealed mechanism contributes to easiest possible maintenance and long life.

The blade mechanism develops enormous leverage in initial opening and final closing. Ice accumulation or corrosion at either end is easily broken. Variation in leverage equalizes the gravitational pull on the blade and results in smooth uniform operational effort.

This powerful, simplified blade mechanism is fundamental with all MK-40 Air Switches—from 400 to 5000 amperes and from 7.5 to 380 kv. It is another reason for preferring DELTA-STAR MK-40 Switches.

When you want the best in high voltage switches specify the MK-40

DELTA-STAR ELECTRIC DIVISION

H. K. PORTER COMPANY, INC.
OF PITTSBURGH
2437 Fulton Street • Chicago 12, Illinois
District Offices in Principal Cities

THE MONTH IN BRIEF

Record Number of Petition Signers

A history-making record was set by employees of California Electric Power Co. when they secured the greatest number of signatures in proportion to the total registered voters ever to sign an initiative in California. The Calelectric employees were getting signatures for a special election so voters could determine whether the utility company shall buy Riverside facilities.

REAs Appealing Property Tax Law

Wyoming's 15 Rural Electric Cooperatives are appealing to the legislature for revision of action taken last February subjecting the co-ops to state property taxes. Spokesmen for the REAs have said the law will force them to make rate increases unless it is revised.

Snake River-Walla Walla Tie Planned

A direct transmission line between Walla Walla and the proposed Mountain Sheep and Pleasant Valley Dams is planned if the hydro development is approved, according to Paul V. McKee, president of Pacific Power & Light Co., a member of the Pacific Northwest Power Co. Located on the Snake River below Hells Canyon, the project would produce 1,000,000 kw if approved as planned, and would be a big contributor to the 500,000-kw annual increase needed for the Pacific Northwest for the next 10 years, McKee said.

Grand Coulee Generators Get Overhaul

After having been in operation since 1941, the first of 18 108,000-kw generators at Grand Coulee is being overhauled. Six years will be required to overhaul all the 18 generators in the dam's two power houses.

PUD Tries Condemnation of WWP Plant

A condemnation action of the Chelan County PUD against Washington Water Power's Chelan hydroelectric plant is underway. The jury trial is being held in Chelan County Superior Court, Wenatchee, Wash.

B. C. Commission Approves Rural Jobs

Four major rural electrification projects in British Columbia have been approved by the British Columbia Power Commission. Two new distribution lines and two extensions are included. Total cost is $277,000.

REA Gets Funds For Distribution Line

Central Electric Cooperative, Redmond, Ore., has been allotted $275,000 to finance the construction of 68 miles of distribution line to serve 84 new rural consumers and system improvements.

Colorado Central and REA Tangle

Colorado Central Power Co. and Inter-Mountain Rural Electric Assn. are in dispute over service to a proposed residential subdivision at Littleton, Colo. A temporary injunction order restraining the REA from constructing additional line or providing service in the area has been issued. A permanent injunction is sought.

Council Seeks Construction Approval

Seattle City Council utilities committee is proposing that City Light be authorized to proceed with a $3,028,000 construction program immediately. A new warehouse, Gorge power house improvements, Diablo and Ross Dams improvements are major projects.

Arizona Asks for Glen Canyon Power

Arizona, through its Power Authority, has made application for an allotment of the proposed Glen Canyon Dam in northern Arizona. Exact amount of the allotment will be negotiated at a later date, but the state is asking that it be repaid any loss of power from Hoover or Davis Dams as a result of Glen Canyon construction.

City Pleads Case for McKenzie Dam

Eugene (Ore.) Water & Electric Board is presenting its case for construction of a $7,000,000, 30,000-kw hydroelectric project on Oregon's upper McKenzie River before the Federal Power Commission. The city has Oregon Game Commission backing, since the storage features will allow stream flow during the dry season.

BPA Recommends Speed-up in Budget

Accelerations for scheduled transmission and substation construction programs of Bonneville Power Administration have been recommended in fiscal budget revisions asked of Congress. "Unanticipated increases" in customer requirements prompted the changes.

Chief Joseph-Snohomish Tie Nears End

Construction is under way in western Washington on the final unit of the Bonneville Power Administration transmission line from Chief Joseph Dam across the Cascade Mountains to Snohomish. The 345-kv line is scheduled for completion in August.

Three Ad Awards to Hawaiian Electric

Hawaiian Electric Co. won first prizes for the best single ad promoting the use of electricity and the best ad promoting electrical merchandise. Second place award for the best public relations series was also given to the company.

A Man Likes to Have Partners When There's a Job to Be Done

As any pioneer will tell you, "partnership" helped build the great Northwest.

In the old days, a man took care of his own problems and responsibilities but when the job was a big one, he got help from his friends and neighbors.

It might be a barn-raising . . . stump-clearing . . . branding or harvesting . . . but everyone pitched in to get the job done.

That's the way it is today in making sure our people have all the electric power they need to grow and prosper with the Great Northwest.

The Northwest Electric Light and Power Association is the "partnership" through which power companies, manufacturers, distributors, contractors, and dealers have worked to promote the progress of the electrical industry so that the public may be better served.

Private power companies are taking care of their local power supply responsibilities, building power plants and transmission lines to assure their customers of ample supplies of electricity at all times.

And, on the real big jobs, they're combining their forces or pitching in with the Government to develop the power that can be produced at large multi-purpose projects being constructed by Federal agencies for reclamation, flood control or other public-welfare purposes.

They are doing some of these jobs with their own money, borrowed from insurance companies, banks and people like you and me. In other cases, they are putting up part of the funds to reduce the amount of tax money which must be appropriated by the Government.

This is the "partnership" program and its success means a continuation of the supply of low-cost power necessary to meet your increasing demands.

The utility members of the Association are building 443,000 kw. of new capacity and are planning an additional 3,277,000 kw. Definite proposals for partnership development with the Federal Government add another 1,200,000 kw. to this total.

Last year these companies spent $106,000,000 for capital improvements. This year their budgets total $122,500,000.

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

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Chicago Contractor selects

Plugmold

for 2,250 low cost homes

Electrical Contractor C. W. ABRELL* says:

"To date we have completed the wiring in the first 130 houses of the Markham project. Wiremold's new product, Snapicoil, installs easily and our men like working with it.

Using Plugmold wiring we can give the customer a high quality job which in turn qualifies us for a better profit."

**President*
Edward P. Allison Co., Inc.
Chicago, Illinois

PLUGMOLD'S
More-for-the-Money Value
HELPS SELL HOMES!

Builder Melvin B. Fisher finds Plugmold is "a plus value which can, and often does mean a sale" in his new Markham, Illinois project, where it is being used to provide duplex electrical outlets every 5 feet in every room of the 2,250 homes. The electrical contractor selected Plugmold for these six-room $11,990 homes because it greatly simplifies installation and provides twice the usual number of outlets.

Our Engineering Department will gladly help you with specifications for Plugmold wiring. For more information, write to Dept. M6

THE WIREMOLD COMPANY
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THIS MONTH'S NEWS

WATER RESOURCES BOARD ELIMINATES COMMISSIONS

Oregon legislators have created a Water Resources Board that some observers say will be more favorable to investor-owned utilities in the development of hydroelectric facilities.

The new board eliminates the Willamette River Basin Commission, the Upper Columbia Basin Commission, the Reclamation Board and the Irrigation Board and also takes over jurisdiction of fishery resources formerly in the hands of the powerful Fish Commission. The bill provides that a notice from the fish commissioner that fishways must be installed in new hydroelectric developments may be appealed to the new board.

The seven-member board has a priority of use to follow in rendering decisions on water development measures. First priority is for human consumption, second for livestock and agriculture and others are third.

One commission left intact is the Oregon interstate cooperation commission, which is continued for another two years to work toward a Columbia Basin Compact.

Power Commission Building New Vancouver Hydro Plant

Construction of a 51,000-kw generating plant by British Columbia Power Commission is under way at Ladore Falls, Vancouver Island.

Costing $8,000,000, the new plant will be the first remotely controlled, outdoor unit to be constructed by the commission.

Puget Sound Stockholders Seeking Directors Change

A group of Puget Sound Power & Light Co. stockholders, who is reportedly attempting to elect directors favorable to a merger with Washington Water Power Co., has won a Massachusetts State Supreme Court decision requiring Puget Sound to supply it with a list of stockholders.

The list is wanted to seek proxies for the election.

A Washington Superior Court is expected to fix a date when the committee of opposition stockholders can inspect the list and a date when both sides may begin proxy solicitations.

President Frank McLaughlin said, "The main thing, as far as Puget is concerned, is that the Massachusetts court has finally rendered its decision. The company will now be enabled in due course to hold a stockholders meeting so stockholders can authorize the 50% additional common shares necessary for a half-share distribution, and approve the modernization of the first mortgage, which is advantageous from the standpoint of financing the expansion of Puget's facilities."

Arizona Power Authority Attempts to Build Plant

Arizona's Power Authority has taken first steps toward building its own steam-electric generating plant.

Staff of the authority was authorized to begin preliminary studies of location and size of the plant, because power supplies from Colorado River generating stations may become critical.

Arizona gets 65 to 70% of its Colorado River power from Hoover Dam, which faces the possibility of being shut down, according to K. S. Wingfield, authority administrator. Low water storage has already caused a 30% curtailment.

According to Wingfield, power shortages for the next few months could be met by purchases from private utilities.

BPA Transmission Grid Open To Wheel Partnership Power

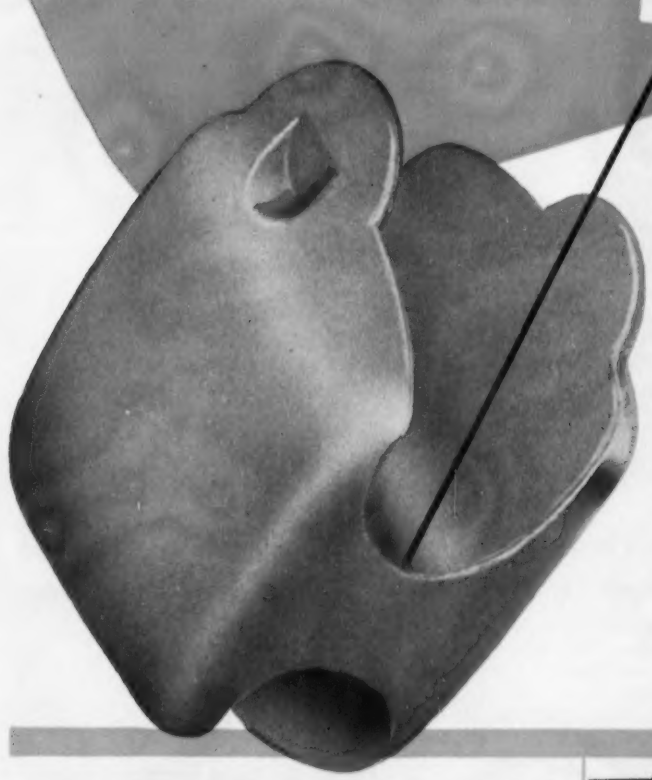
Bonneville Power Administration's "backbone transmission grid" for the Pacific Northwest will be made available to builders of partnership dams, to aid in delivering the energy to key load centers, according to Administrator William A. Pearl.

Wheeling-cost formula for this service is now being worked out by the BPA staff, Pearl said, to be worked out on a reimbursible basis.

Purpose of the study is to aid economic feasibility of the projects to ease the threat of future power deficits in the region. The program has been authorized by Secretary of the Interior Douglas McKay.

Pearl made the statements at a meeting of the North Idaho Chamber of Commerce held at Lewiston.

The Secret is in the "built-in" Spacer

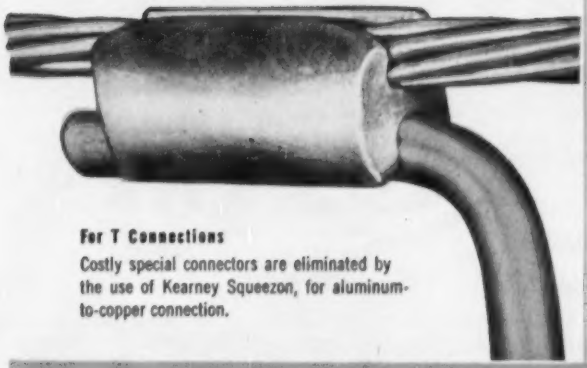


KEARNEY SQUEEZON

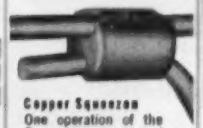
CONNECTORS are designed for greater versatility

The exclusive Kearney design provides the "built-in" spacer. This barrier of metal between the conductors resists galvanic action and, in addition, assures greater conductivity since each conductor is "cold-welded" around its perimeter. Because the wires do not touch each other, there is less danger of flattening or pinching the strands.

KEARNEY SQUEEZON connectors are applied with hydraulic or mechanical tools, in less time . . . at a fraction of the cost of older types of connectors.



For T Connections
Costly special connectors are eliminated by the use of Kearney Squeezon, for aluminum-to-copper connection.



Copper Squeezon
One operation of the Squeezon compression tool permanently bonds this type of joint.

Service Entrance Sleeves
for high-pressure connections of secondary to meter loop.

Dead-Ends
One crimp per Squeezon saves time when multiple connections are used.

Stirrup Tap
Two Squeezons and a short piece of wire make an inexpensive, easy-to-install stirrup, insures a rigid, connection on hot lines.

Aluminum Squeezon
Provides large area contact — prevents cold flow; for aluminum to copper or copper to aluminum.

Line Splice
Line splices are better electrically and mechanically with Kearney sleeves.

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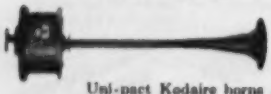
For over 75 years, Faraday has designed and produced visual and audible signals and complete signal systems of proven dependability. Whatever the signal requirement . . . bells, buzzers, chimes or annunciators . . . there's a Faraday unit or system that offers a quality product . . . with low cost installation . . . simplified maintenance and service for you and your customer. Increase *your* profits . . . sell and install FARADAY. Ask your distributor for information on Faraday's complete signal line.



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Uni-pact interchangeable signals . . . one adapter plate fits bells, buzzers, horns and chimes . . . for easy change and maintenance. Safety too . . . featuring electrically dead front adapter plate . . . *no exposed terminals.*

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IDAHO POWER GETS OKAY FOR ONE OF THREE DAMS

Idaho Power Co. has won part of the battle for Hells Canyon development, at least temporarily, as William J. Costello, Federal Power Commission examiner, authorized issuing a license for the proposed Brownlee Project and denied the two smaller units.

Public power advocates have said they will appeal the decision, while Idaho Power President T. E. Roach has said the examiner's report "paints the company's construction and power costs in the worst possible light."

Roach referred to the FPC staff's estimated cost of $191,328,000 on which the examiner's decision was made, while Idaho Power has said Morrison-Knudsen would build the three dams for $133,000,000. The FPC's estimate for Brownlee alone is $95,433,000.

The decision is subject to review by the commission, either by appeal by parties to the proceeding within 20 days (from May 6), or upon the FPC's own motion for the next 10 days. If no review is initiated, the decision is final at the end of the 30-day period (June 6).

Rate Increases Draw Fire From REA Group Customers

Arizona's corporation commission has been petitioned to assume jurisdiction over Trico Electric Cooperative of Pima County.

Petitioner is Mount Lemmon Development Assn., which opposed increases of minimum power rates from $3 to $5 monthly, and advance payment system and reading of meters only once a year.

At issue is whether all cooperatives in the state belong under corporation commission regulation. Trico is expected to contend that, being government-financed and operating without profit, it is not subject to control.

Pacific Northwest Utilities Petition For Columbia Action

Congress has been petitioned by Pacific Northwest private and public electric utilities to keep present Columbia River development on schedule.

Utilities included in the petition are: Eugene Water & Electric Board, Pacific Power & Light Co., Portland General Electric Co., Cowlitz County PUD, Wahkiakum County PUD, Pacific County PUD and Grays Harbor County PUD.

Mason County PUD No. 1, Washington Water Power Co., City Light of Seattle and Grant County PUD are also signers.

The petition states:

"Almost as urgent to our region as the maintenance of schedule on present construction is the need for prompt decisions on the start of new projects.

"We have no time to lose if we are to avoid a hiatus in our development when projects now building have been completed and their power output absorbed, as it will be almost as quickly as the generators start turning."

Local utilities, the statement said, "are ready, able and willing to make a very substantial contribution toward" the $250,000,000 to $300,000,000 which will be required annually from all sources to meet the growing power demand.

Noxon Rapids Construction Will Be Started Next Month

Washington Water Power Co. plans to begin construction of its Noxon Rapids Dam in northwestern Montana in July. First phase of construction is relocating 17.5 miles of Northern Pacific railroad tracks.

Kinsey M. Robinson, WWP president, said, "With the absence of opposition to construction of the dam, we hope we can proceed according to schedule."

The $85,000,000 project would have an initial capacity of 400,000 kw, due to be available in 1960, according to the present schedule. It is located across the Clark Fork River, 23 miles upstream from the Cabinet Gorge Dam.

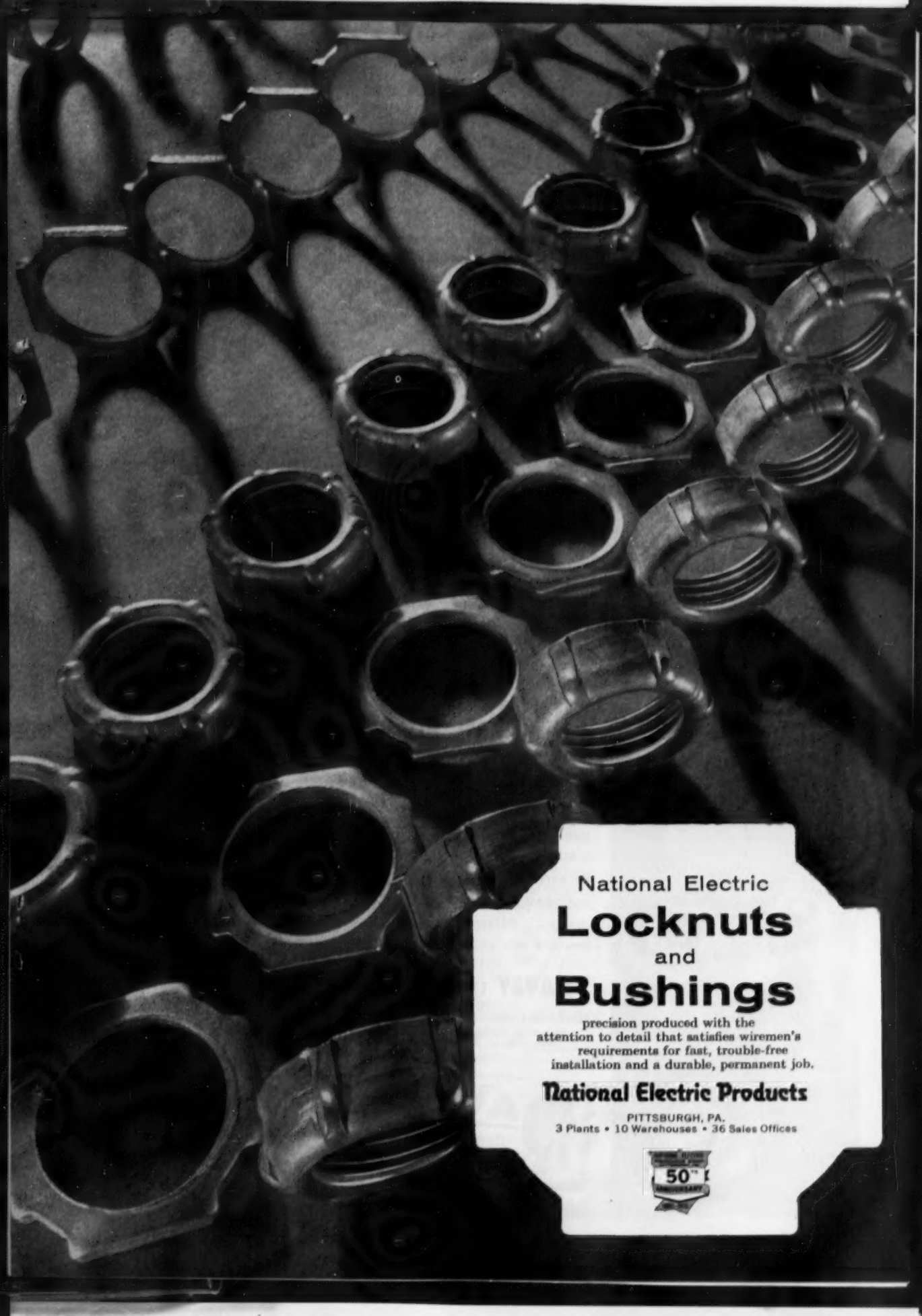
Excess Montana Electricity Slated for Use in Wyoming

Pacific Power & Light Co. and Montana Power Co. have reached an agreement on a plan to turn up to 60,000 kw of excess Montana power into Wyoming lines this fall.

President Paul B. McKee told a meeting of Wyoming division employees of Pacific that the $1,500,000 plan includes construction of a transmission line between Billings, Mont., and Lovell, Wyo.

The proposed line would tie in with the Bureau of Reclamation system in Wyoming and the plan has been submitted to the bureau for approval. The plan is designed to help firm up Wyoming's power supply, now largely dependent on the bureau's hydro plants. Drought conditions in the area threaten a shortage.

Even with the additional Montana power, McKee said Wyoming still needs a new 60,000-kw steam plant that has been proposed.



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SWIVEL *Single, Double and Triple reflector units*

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BEST SELLING FEATURES—Patented, concealed, hang straight swivels with 28° swing; solid aluminum hangers; threadless, twistlock connections.

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DECORATIVE *Opal Glass Bowl and Sphere fixtures*

BEST SELLING FEATURES—Distinctive kurt versen decorative illumination supplied in a variety of fixtures for pendant, ceiling or wall installations.

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Englewood, New Jersey, 32
Contemporary lighting *creatively* engineered!

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Davey is doing line clearing for 12 Public Utilities on the Pacific Coast —most of them served continuously for over 20 years. Davey specialized equipment and efficient methods save money . . . Davey surgical pruning benefits trees—builds goodwill.

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RIVERSIDE VOTERS SIGN UTILITY SALE PETITION

Riverside, Calif., voters have approved a special election to determine whether the city's electric facilities shall be sold to California Electric Power Co. Signatures of 40% of the qualified voters were secured on petitions, though 15% was adequate to call the election.

Calelectric has offered to pay the city $7,300,000 for the facilities. Approval is required by the majority of voters and five of the city's seven city councilmen.

Guarantees included in the purchase agreement include: construction of a new office building and industrial center; retention of all employees of the city light department at the same or higher salaries; and no increase in electric rates for at least five years.

In addition, the company plans to build a new four-unit steam plant at an estimated cost of $34,000,000, to be located at Riverside if the sale is consummated. The plant will be constructed elsewhere if the sale does not go through.

Atom-Powered Uranium Mills May be Constructed in Utah

Financier Floyd B. Odlum is considering construction of two uranium processing mills at Green River and Moab, Utah, with both mills using nuclear power.

In talks with Atomic Energy Commission officials at Grand Junction, Colo., Odlum said he had already discussed his plans with Westinghouse Corp. and North American Aviation Inc., who are both doing research on reactors.

Odlum said construction of the Green River mill would begin four to six months after AEC approval, and would be finished a year later.

Albeni Dedication Program Will Feature Army Executive

More than four years of construction at Albeni Falls Dam in northern Idaho will be climaxed with a formal dedication June 24.

George H. Roderick, assistant secretary of the Army for civil and military affairs, will dedicate the dam, located on the Pend Oreille River between Priest River, Idaho, and Newport, Wash.

Corps of Engineers has said the third unit of the dam may be ready for dry-out and test on the dedication date, though it was scheduled for Sept. 1.

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SOLDERED PORCELAIN

Moisture, Oil and Gas Tight Factory Sealed Joints Without Gaskets

These potheads are factory assembled, with metal-to-porcelain soldered joints. This method completely eliminates the possibility of future trouble due to loosely gasketed joints. When these potheads are used, the responsibility for properly sealed joints rests with our factory. Troubles due to aging, cold flow and permanent set of gasket materials are eliminated.

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PNP ENGINEERING REPORT GIVES DETAILS ON DAMS

Early indications are that Pleasant Valley Dam, a proposed installation by Pacific Northwest Power Co. 34 miles below Hells Canyon, will be an arch-type dam.

Preliminary surveys show the dam would be 500 ft high and 1,200 ft across, with spilling over the center of the arch rather than through gateways.

The proposed dam would back up a reservoir covering 6,000 acres, reaching 34 miles upstream, with 850,000 acre-ft of storage capacity. About 300,000 acre-ft of the stored water would be usable for power generation and flood control.

A reinforced concrete power house will produce 725,000 kw at first and eventually 870,000 kw. The first generators would be rated at 145,000 kw, or 170,000 at full gate, and five semi-outdoor units would be installed with a sixth added later.

Federal Funds Available For Mossyrock Dam Construction

The city of Tacoma may obtain as much as $25,000,000 in federal funds to aid in construction of the Mossyrock hydroelectric dam on the Cowlitz River, Mayor Harold Tollefson told the city council after a trip to Washington, D. C.

The funds would recompense the city for flood control features of the dam under the administration's partnership program, Tollefson said.

Mossyrock is the second unit of a $146,000,000 power development on the Cowlitz River. The first is Mayfield Dam.

• **A call for bids** on a $15,000,000 bond issue to start construction of Mayfield Dam on the Cowlitz River has been authorized by the Tacoma Public Utilities Board. Bids are already in to supply 16 transformers, several circuit breakers and a condenser for the project. They will be opened June 21.

• **Dedication** of Lookout Point and Dexter Dams June 25 will mark formal completion of work on the fifth phase of the approved 19-project multipurpose development of western Oregon's Willamette Valley.

• **World Symposium** on Applied Solar Energy program details are being worked out for the meeting in Phoenix Nov. 1-5. Designed to interest science and industry, the program is expected to attract an attendance of 800 or more.

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Crapo Guy and Messenger Strand

IN THE FIELD as in laboratory tests . . . ***Crapo*** Galvanized Steel Strand proves itself capable of withstanding severe punishment. Steel's inherent strength and durability are combined with definite economies in every size and grade of ***Crapo*** Steel Strand. You'll find the heavy, ductile, tightly-bonded zinc coatings, applied by the famous ***Crapo*** Galvanizing Process, provide lasting protection against corrosion.

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QUICKLY Installed
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EVERSTICK ANCHORS

For new construction and maintenance —Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resilient, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

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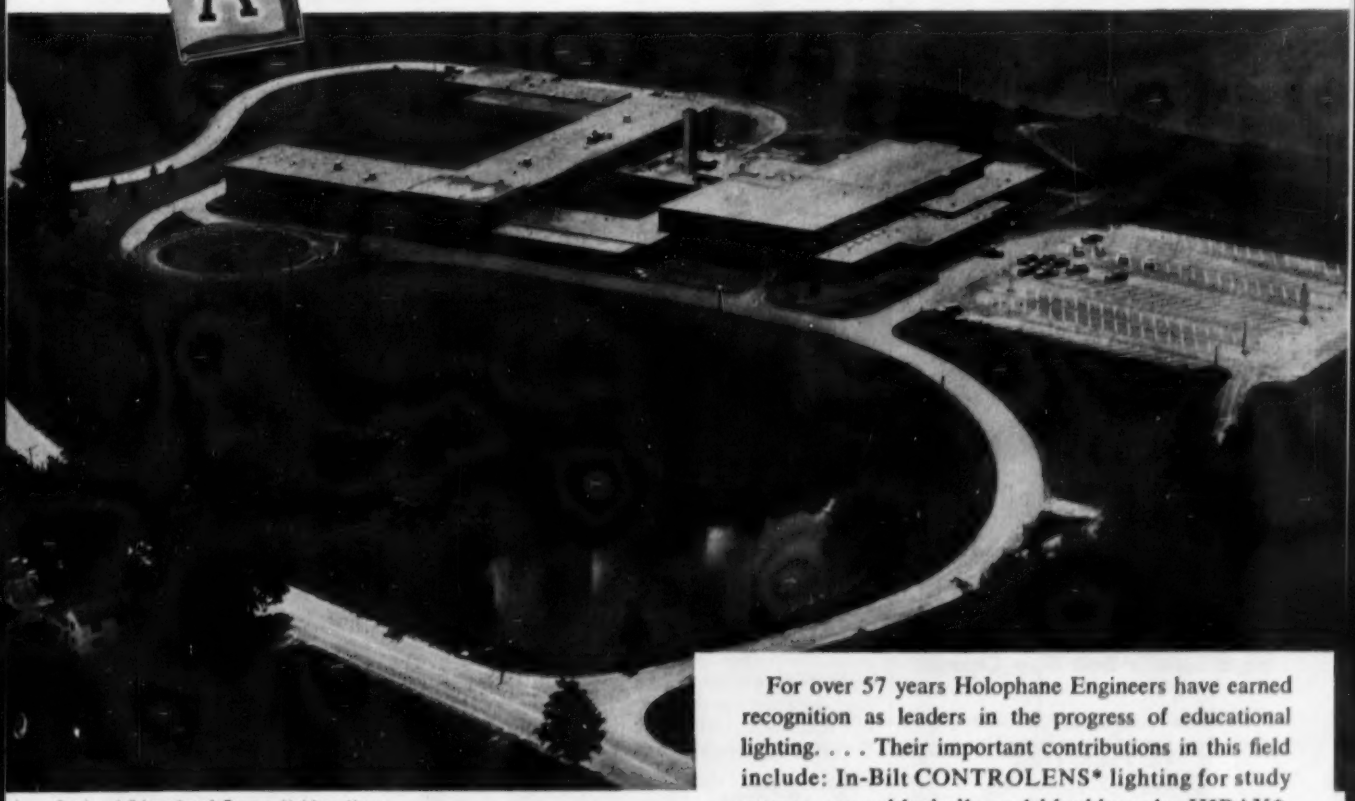
Q ...*WHAT is the Foremost Institutional Project in America?*

A The Multi-Billion-$ EDUCATIONAL BUILDING PROGRAM

Q ...*WHO are Recognized Authorities on Educational Lighting?*

A Unquestionably, the HOLOPHANE ENGINEERING STAFF



Regional Educational Center, Holden, Mass.

For over 57 years Holophane Engineers have earned recognition as leaders in the progress of educational lighting. . . . Their important contributions in this field include: In-Bilt CONTROLENS* lighting for study rooms, assembly halls and blackboards; HIBAY*, LOBAY* and REFRACTOLENS* lighting for recreational areas, and many other major developments.

Today, with this unique experience and specialized skills, Holophane is finding new and better ways to meet the lighting needs of expanding educational facilities—in colleges, as well as secondary schools.

Architects, engineers and educational administrators are invited to call in Holophane Engineers—at headquarters or in the field—for consultation without obligation.

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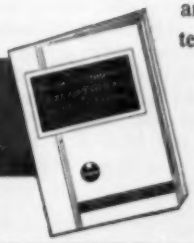
For Better Lighting
Be Specific . . .



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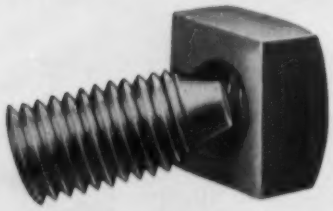
Cross Arm Braces

"HANDIDRIVE" Pole Steps



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PUDS FACE PROPERTY TAX IF COURT RULING HOLDS

Oregon's Peoples Utility Districts will become liable for property taxes levied by counties and other political subdivisions of the state if a ruling by Circuit Judge Malcolm W. Wilkinson survives subsequent tests.

Judge Wilkinson ruled in favor of Wasco County tax levies against the Northern Wasco County PUD. He rejected the PUD argument that the state constitution, in authorizing the formation of PUDs, thereby limits the power of the legislature to impose taxes on such districts.

An appeal to the Oregon Supreme Court is expected.

Utility Companies Opposing Bills to Free Boulder City

Congressional action on two bills designed to free Boulder City, Nev., from federal supervision are being opposed by Southern California Edison Co. and the Los Angeles Department of Water & Power, operators of Hoover Dam.

If Boulder City were allowed to incorporate under Nevada State laws, the government would give the city its share of power from Hoover Dam, which is 20,000 kw maximum.

Attorneys for the intervening utilities said the present amount of power used at Boulder City is comparatively small but the amount could be expected to increase if the city were incorporated, thus cut back allocations to the two utilities.

Edison's El Segundo on Line At May Dedication Ceremony

A dedication May 25 officially launched the operation of the first unit of Southern California Edison's El Segundo steam-electric generating station.

A. N. Kemp, company director, opened the throttle that started the 160,000-kw giant into service.

El Segundo has a fully outdoor operating deck where all major equipment is located and is fired by fuel oil from a Standard Oil Co. refinery nearby. Sea water is used as a coolant for the condensers.

The plant was designed and built by Bechtel Corp.

• **A recent addition** to a California bill provides a maximum penalty of six months in jail, a $500 fine or both if hinges and locking mechanisms are not removed from abandoned refrigerators or ice boxes.

• **Heat** from an experimental atomic reactor about 30 miles northwest of Los Angeles is being offered for sale by the Atomic Energy Commission. Preference will be given to public bodies and cooperatives, but private industry has been invited to bid for the heat. The heat would permit generation of about 7,500 kw of electricity. Southern California Edison Co. has already submitted a bid for the heat.

• **Arizona Public Service Co.'s** electric service franchise with Winslow has been renewed for another 25 years by a vote of 240 to five. The city realizes about $4,000 a year from the franchise.

• **University of California** is offering a new electrical engineering correspondence course entitled "Linear System Solutions by Transform Methods." Details are available on page 32 of the 1955 University Extension correspondence catalog.

• **Reynolds Metals Co.** has been granted five coal leases on 14,000 acres in the Lake DeSmet area of northern Wyoming, an area that the state's natural resources board has been promoting to Reynolds as a site for a steam power plant and aluminum processing mill.

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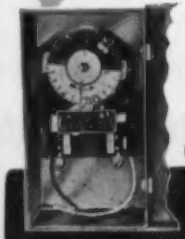

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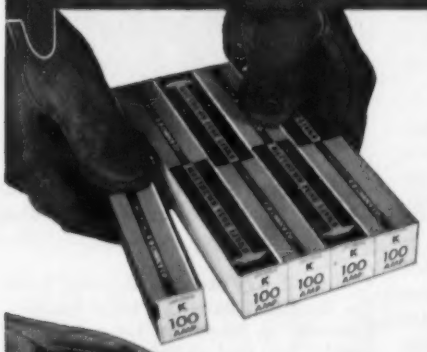

An overwhelming majority of power companies, in response to a survey, asked for fuse links to be packaged and identified like this! Links rated 100 amperes and below are packaged in sturdy 5-link containers. Links over 100 amperes come in 3-link containers. Each of the joined packages is a container in itself. Perforation permits easy, immediate separation of each unit.

Lineman can easily pull out a link while wearing gloves. For convenience, five 5-unit containers (25 links) are packaged in a carton and three 3-unit containers (9 links) come in a carton. Everything, including the link, is clearly identified. Each link is stamped to show type and rating. Link type and rating is printed in big type on both ends of each single unit container. The large shelf package also clearly shows type, catalog number, rating and time-current characteristic curve numbers.

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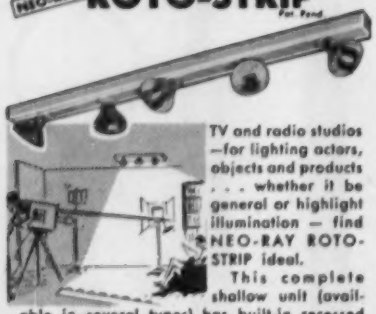

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NEWS ABOUT PEOPLE

Division Managers Promoted At Pacific Gas and Electric

W. Frank Pape is the new manager of Pacific Gas and Electric Co.'s large East Bay division and Elias S. Day succeeds Pape as head of the company's North Bay division, according to a report from Norman R. Sutherland, PG and E president.

Pape succeeds the late William H. Park in the East Bay position.

With PG and E since 1923, Day has served as electric superintendent of the Coast Valleys division at Salinas and, since 1953, of the San Jose division.

Service with PG and E for Pape dates back to 1912 when he worked after school and on Saturdays as a messenger. He worked into the administrative ranks by 1934 and became North Bay manager in 1953.

Pape

Day

• **Richard M. Bibbs** of Vancouver has been named executive assistant to Vice-president Tom Ingledow of British Columbia Electric Co. **W. C. Mearns** succeeds Bibbs as acting director of research and administrative control. Bibbs is a graduate of the University of British Columbia and started with the company in 1945. Mearns, a graduate of Stanford, has been with the company since 1927.

• **Henry B. Sargent,** president of Arizona Public Service Co., has been elected chairman of the Electric Companies Public Information Program.

• **Rex Hardy,** Northridge, an attorney, has been appointed as a member of the California Public Utilities Commission. He succeeds **Kenneth Potter** of Fresno, whose term expired last January.

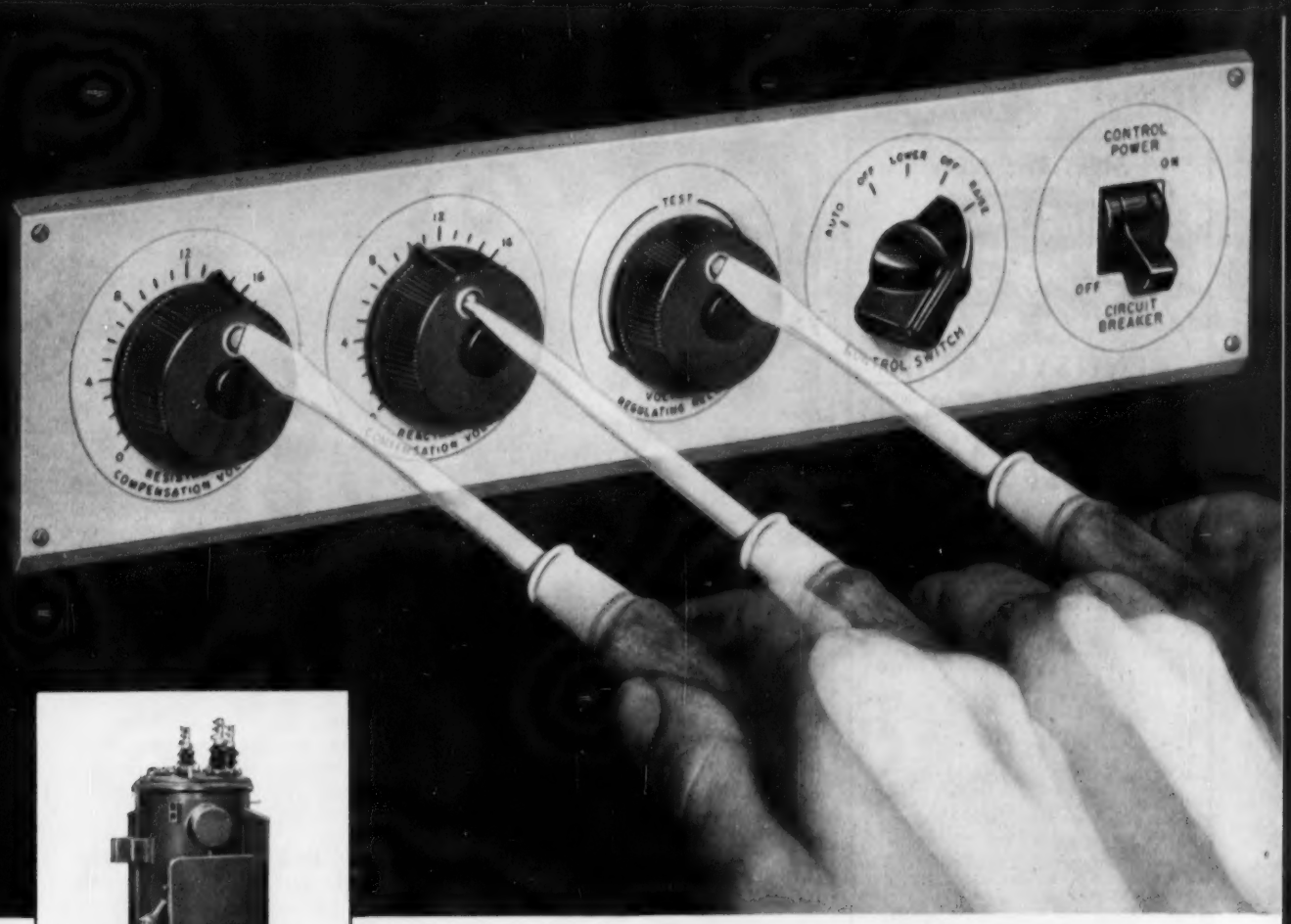
• **Owen E. Grinde,** Montana Power Co. public relations man, has been promoted to advertising and publicity manager for the company. He succeeds **Colin Raff** who has been named executive assistant. Grinde, a graduate of Montana State University and former Butte newspaperman, joined the company in 1952.

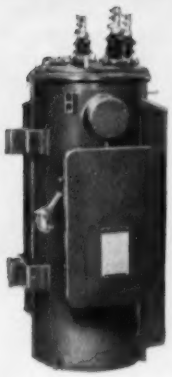
• **Hance H. Cleland,** former president and chairman of the board of San Diego Gas & Electric Co., has ended active association with the company, which has been as consultant since 1953 when he retired as a director. He was president of the California Oregon Power Co. before joining the San Diego company as president in 1941.

• **Russell E. Potter** is resigning from the British Columbia Public Utilities Commission to set up his own engineering and consulting firm.

• **Allan F. Elder,** assistant treasurer of the Washington Water Power Co. since 1948, has been named to succeed the late Carl E. Gieseker as treasurer. Elder joined WWP 29 years ago and rose through the accounting division. **Clarence A. Caulfield** succeeds Elder as assistant treasurer.

• **C. Spence Purnell,** sales executive for Westinghouse Electric Corp. for many years in New York City, has been named manager of the company's South Pacific district, headquartered in Los Angeles. His new district includes southern California, Arizona and Las Vegas, Nev.





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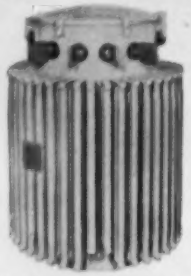

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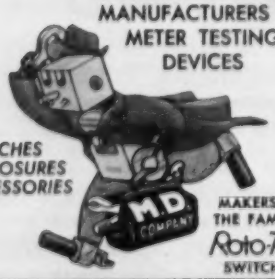

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Renwick

• **Bruce Renwick,** general counsel of Southern California Edison Co., has been elected a vice-president. He is a graduate of Stanford Law School and has been associated with Edison since 1942. Renwick is a member of the EEI legal committee, Pacific Coast Electrical Assn., the Federal Power Bar Assn., and other organizations.

• **C. B. Nelson** will succeed **William P. Bedgood** as electric superintendent of Pacific Gas and Electric Co.'s San Francisco division. Bedgood retires from the position June 30 after 45 years of service.

• **William P. Reilly,** Arizona Public Service Co. vice-president, is the new president of the Phoenix Chamber of Commerce.

Deaths

• **Patrick Joseph Givnan,** 87, founder of the Givnan Electric Supply & Contracting Co., died recently in Seattle.

• **Roy H. Skill,** 69, member of the Washington State Power Commision and former assistant vice-president of Pacific Power & Light Co., died May 6 at Yakima after a heart attack. He retired from PP&L two years ago. Before being made assistant vice-president, he was assistant general manager, Washington operations, Yakima.

• **Arthur J. Turner,** retired chief engineer of Washington Water Power Co., died recently in Spokane at the age of 76. He retired in 1945 after 31 years with WWP. Mr. Turner had worked on the Post Falls, Little Falls and Long Lake Dams for WWP, and prior to that on the Gorge power plant on the Skagit River and the Chelan Lake power plant.

Robertson

• **Lawrence M. Robertson,** chief electrical engineer for Public Service Co. of Colorado, was honored June 10 when he was presented with an honorary doctorate in electrical engineering from the University of Colorado, his alma mater. Robertson is known nationally in the industry because of many published engineering studies and through membership in industry and engineering associations.

• **James S. Bush,** veteran salesman for the North Coast Electric Co., Seattle, has retired after 25 years with the company. Fellow employees presented him with an outboard motor and fishing equipment at a farewell dinner.

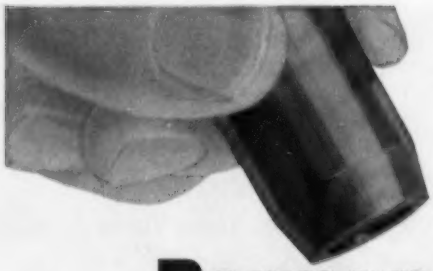
• **R. L. Lemmon,** Line Material Co., Seattle, toured Alaska in April. He was on the program of a meeting of Alaska electric utility companies.

• **New field representative** for General Electric Air Conditioning Division is **Herman Van Nelson,** former air conditioning distributor in Boise. In his new job he will be located at Salt Lake City and be sales representative in Montana, Idaho, Utah, Washington, Oregon and Colorado.

• **Dr. Irving H. Dearnley** has been appointed by General Electric as manager of the salary and wage administration section at Hanford atomic energy plant, Richland, Wash.

• **Richard L. Erlin** has been named manager of engineering sales for Kaiser Steel Corp. in Oakland. With the company 11 years, Erlin has been sales representative, manager of central district sales and with Kaiser-Frazer at Willow Run, Mich. He is a native of San Francisco.

• **Lyons O. Dugan** is new sales manager of the Western district of the Jefferson Electric Co. His headquarters are in Los Angeles.



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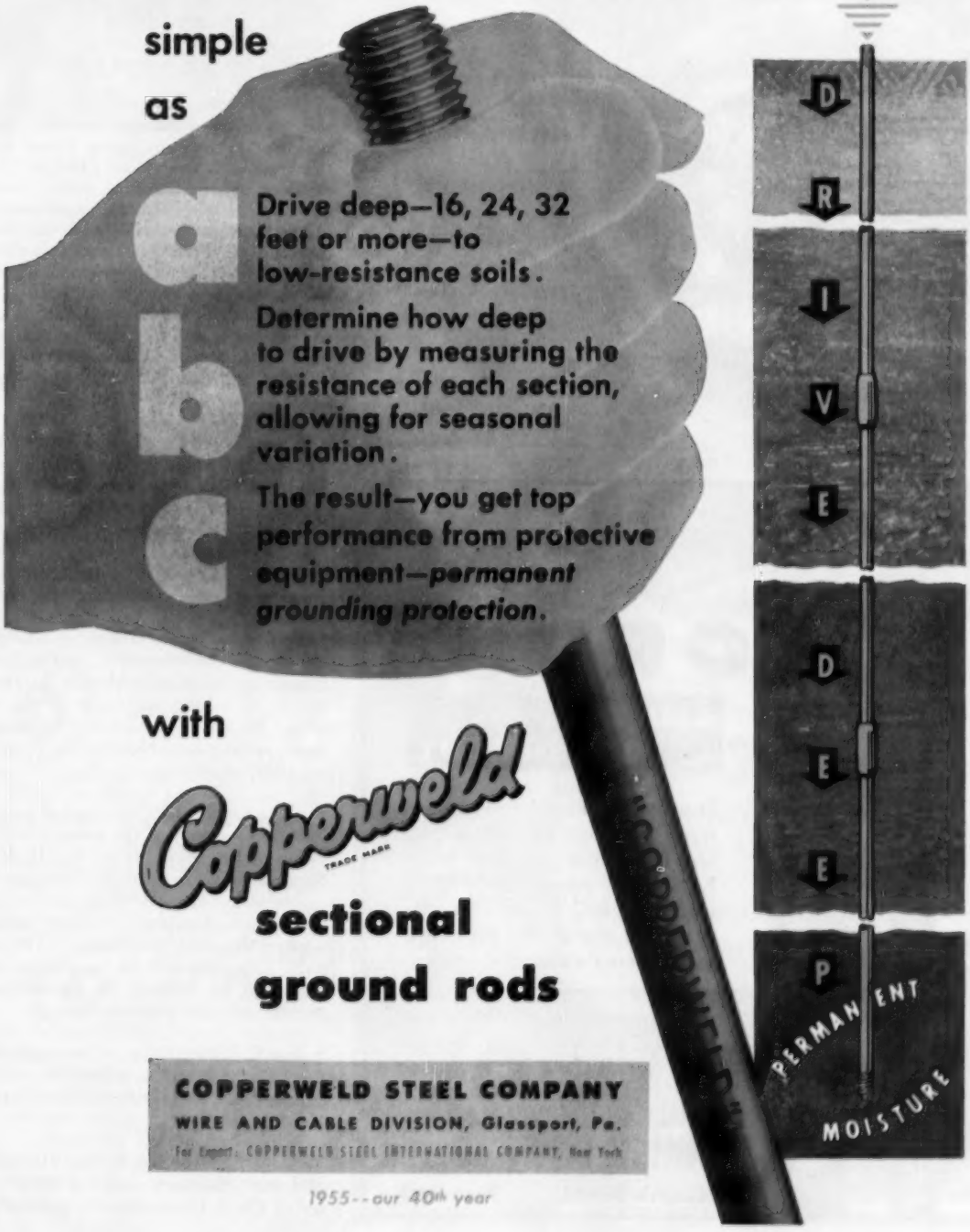

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NOTES ON THE TRADE

General Electric President Is Western States Visitor

General Electric Co., spending more money for expansion this year than ever before in its history, "is the most emphatic evidence I can submit of the company's faith in America's future," was a statement of Ralph J. Cordiner, president of G-E, during a San Francisco visit.

Cordiner, on a tour of four Western states, told reporters that the company now has 11 manufacturing plants in the West with more than 2,000,000 ft of floor space. He said more than $60,000,000 is spent for the purchase of Western raw materials, and that the company employs 15,000 people in this region. He credited population shifts with stimulating Western growth.

Management conferences and talks to employees took Cordiner to the Pacific Northwest, San Francisco and Los Angeles, and then to Salt Lake City on his Western tour.

• **Kerite Co.** has appointed **Robert A. Young** as Pacific Coast manager. Young was first associated with the company as manufacturer's representative in 1946, covering power division sales in Arizona and southern California. Young will continue to operate his own established business.

• **Leo Slam,** vice-president in charge of sales for Electrovector, was a San Francisco visitor with **Marion Baxter,** Baxter Co., who represents Electrovector on the West Coast. The company manufactures electric space heating equipment.

• **E. J. Appel** is new manager of facilities development of the reduction division of Reynolds Metals Co. **H. W. Shoemaker,** manager of the company's aluminum reduction plant at Longview, Wash., has been appointed manager of the reduction plant at Troutdale, Ore. He will be succeeded at Longview by **Vernon G. Kneeskern,** present assistant plant manager.

• **Jess C. Little,** technical manager of the Fanner Mfg. Co. electrical products division, was a recent West Coast visitor.

• **Globe Electric Supply Co.,** 215 Second Ave., Seattle 4, is now a distributor of Clark Controller Co. products.

Anderson

• **Southern States Equipment Corp.** is establishing a Western representative of the company at Portland, Ore. **H. C. Anderson Jr.** is filling the position. He will work directly with manufacturer's agents for the company in Colorado, Wyoming, Montana, Idaho, Utah, Washington, Oregon and California.

• **General Electric Co.** held a formal dedication of its new microwave research laboratory at Stanford May 27. On hand for the event was **Dr. W. R. G. Baker,** G-E vice-president and general manager of the company's electronics division. While arrangements for the dedication were being made, G-E announced that the laboratory would be doubled in size and staff by the end of 1955.

• **Cornell-Dubilier Electric Corp.** celebrated its 45th anniversary with the opening of a new electronics research laboratory at Venice, Calif. Present were **Octave Blake,** president, and **William Dubilier,** vice-president in charge of development and research.

• **Electric utility engineers,** executives and maintenance supervisors will find much of interest at the Western Plant Maintenance Show to be held at Los Angeles, July 12-14. Latest solutions to modern problems of substation control, wiring installations and check-up accessibility of electrical equipment will be among the many exhibits. Concurrent with the maintenance show, a detailed conference program to examine the aspects of maintenance of modern equipment will be held at the Ambassador Hotel. The relationship of electrical maintenance to general production will keynote the sessions.

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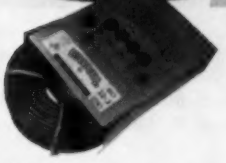

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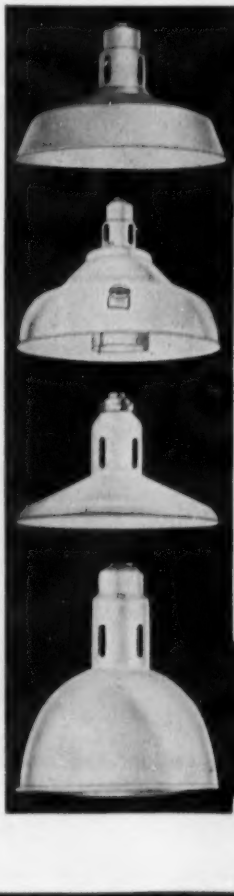

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PROFILES

Robert H. Gerdes is now executive vice-president and general counsel of Pacific Gas and Electric Co. He was promoted after James B. Black became board chairman and Norman R. Sutherland became president

Thomas W. Delzell is executive head of Portland General Electric Co. (EWest, May 1955), as the result of executive changes following retirement of James H. Polhemus as president. Delzell is board chairman

Throne

Neithercut

R. F. Throne, chief mechanical engineer, Public Service Co. of Colorado, received a plaque as the outstanding member of the Rocky Mountain Section, American Society of Mechanical Engineers. At a dinner in his honor, D. C. Neithercut, regional chairman, presented the award, first of its type and only one given in the Rocky Mountain area

Wicks

Metz

Norman Wicks, NEMA's National Adequate Wiring Bureau manager, and A. F. Metz, Okonite board chairman and NEMA president, attended Salt Lake City's Northwest Electric Light & Power Assn. Business Development meeting held last month

Columbia-UF

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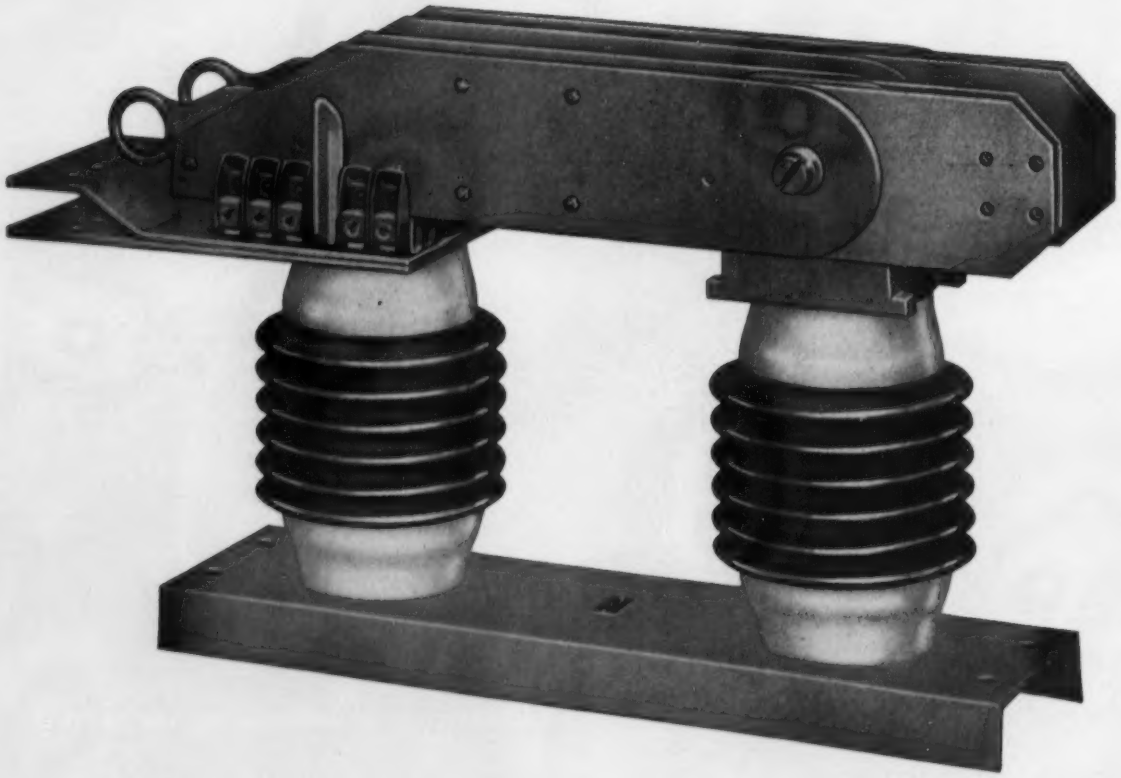

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The bride will kiss you—when she unwraps the package that contains your extra-thoughtful electrical gift! No other present combines so much useful, every-day pleasure with so much streamlined beauty. Any one of these gifts you select will be a useful, lasting reminder of your love.
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The active, year around contact between P.C.E.A. members reaches a new high when convention time rolls around each year.

Our 1955 convention, held a few weeks ago, was the best ever, made so by the enthusiastic participation of more than 1100 people representing every branch of the electric industry in the west. There will be another next year, and we hope to see you there.

In the meantime, we'd like to emphasize that the convention is only a focal point for activities which, on a less concentrated scale, are going on all the time. Discussion and interchange of ideas and information, through committee meetings and conferences, are the heart of the P.C.E.A. program—and the real benefits of P.C.E.A. membership.

Associations do those things which most people think just happen.

PACIFIC COAST ELECTRICAL ASSOCIATION

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